



▶ Polycom MGC+50/  
MGC+100  
Hardware & Installation Guide

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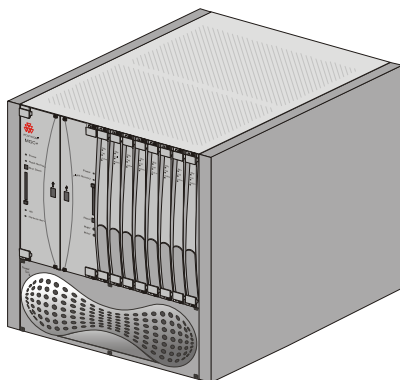
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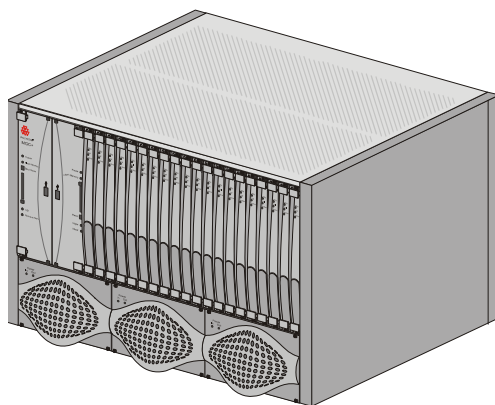
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## Before You Begin

The MGC+50 and the MGC+100 are high performance, high capacity Multipoint Control Units (MCU) which support up to 48 ports for the MGC+50, and 96 ports for the MGC+100. They utilize a variable port bandwidth ranging from 56 to 1920 Kbps.



*Figure 1-1: MGC+ 50*



*Figure 1-2: MGC+ 100*

The system meets International Telecommunication Union - Telecommunication Standardization Sector, (ITU-T, formerly CCITT) standards for multipoint multimedia bridging devices, and meets ETSI standards for telecommunication products.

The flexible architecture in the system is designed to accommodate users' changing multipoint needs. This system utilizes a modular "universal slot" platform that allows the formation of different configurations based on users' individual port capacity and functionality requirements.

## MGC+ Unit Main Features

The MGC+ unit offers the following features:

- Supports a large number of ports (48 for the MGC+50, 96 for the MGC+100) running at 128 Kbps
- Universal slots, telco grade high availability with hot-swappable modules, redundancy, on-line upgrading and dynamic resource allocation
- Support for standard network interfaces (ISDN, T1-CAS, LAN and V.35 serial) for the easy integration of conference elements into external network management and billing systems
- Support for up to 16 operator workstations (PCs) connected to either a local or remote MCU; each operator workstation can be connected to several MGC+ units
- Multirate conferencing and Transcoding (audio and video, including high bit rate video and data bit rate conversion)
- Channel aggregation according to H.221, Bonding and Multirate (H0)
- Automatic rate detection upon endpoint connection to the conference
- H.320/H.323 video, T.120 data conferencing
- Enhanced Continuous Presence (multi-image video)
- IVR (Interactive Voice Response)
- Windows NT®/Windows 2000®/Windows XP® based operator station
- Multiple operators per conference
- Multiple conferences and MCUs per operator
- TCP/IP - LAN - Internet access
- Supports serial communication (V.35/RS-530/RS-449) (optional)

## MGC+50/MGC+100 Specifications

Table 1-1 lists the specifications of the MGC+50 and the MGC+100 units.

Table 1-1: MGC+ Specifications

Physical	MGC+50	MGC+100
Height	16"	16"
Width	15", 19" with mounting plate	23" with mounting plates, 19" with unit at 90°
Depth	19.5"	19.5"
Weight	Up to 24 kg	Up to 48 kg
Free space above the MCU rack	3" in standard installations	3" standard installation, 9" if a MPI-8 is to be fitted
IP Protocols	MGC+50/MGC+100	
Audio	G.711, G.722 (48), G.722.1, G.728, G. 723.1, G.729A, Siren 7, Siren 14	
Video	H.261, H.263 (Annexes N, F, P), H.264	
Data	T.120	
H. 320 Protocols	MGC+50/MGC+100	
Audio	G.711, G.722 (48), G.722.1, G.728, G. 723.1, Siren 7, Siren 14	
Video	H.261, H.263 (Annexes N, F, P), H.264	
Data	T120	
Cascading	H.243	
Channel aggregation	H.221, BONDING, Multi-Rate (H0)	

Table 1-1: MGC+ Specifications

Network interfaces	<b>ISDN:</b> T1 PRI, E1 PRI, Multirate ISDN, NFAS, Leased lines-T1/E1, Switched 56 <b>T1-CAS:</b> T1-CAS lines for Audio Only connections <b>IP (H.323 and SIP):</b> LAN <b>Serial:</b> V.35, RS449, RS530/A
<b>External Communications</b>	<b>MGC+50/MGC+100</b>
Data rates	56 Kbps - 1920 Kbps (E1)
Network interfaces	ISDN T1/ E1, T1-CAS, LAN, serial (MPI)
MGC+ Manager control connection	An independent LAN connection (separate from the Network connection)
Clock synchronization	Synchronizes to external network
<b>Local/Remote External Equipment</b>	<b>MGC+50/MGC+100</b>
Operator workstations	LAN/RS-232/Modem/Internet
Reservation systems	LAN/Internet/Modem
<b>Environment</b>	<b>MGC+50/MGC+100</b>
Operating temperature	10°–40°C (50°–104°F) 10°–35°C (50°–95°F) when installed in a 19" rack
Storage temperature	-40°–70°C (40°–158°F)
Relative humidity	15%-90% no condensing
Operating altitude	Up to approx. 3,000m (10,000ft)
Storage altitude	Up to approx. 12,000m (40,000ft)
Operating ESD	+8kV
Storage ESD	+15kV

Table 1-1: MGC+ Specifications

<b>System Communications</b>	<b>MGC+50/MGC+100</b>	
Integrated scheduler	Yes	
API to 3rd party reservation systems	Yes	
<b>Conference Setup (Scheduled/ Unscheduled)</b>	<b>MGC+50/MGC+100</b>	
Meet Me Per	<ul style="list-style-type: none"> <li>• Conference</li> <li>• MCU</li> <li>• Channel</li> <li>• Party</li> </ul>	
Dial-out/Dial-in	Yes	
<b>Diagnostics</b>	<b>MGC+50/MGC+100</b>	
Power up	Yes	
On-line	Yes	
Remote	Yes	
<b>Serviceability / Reliability</b>	<b>MGC+50/MGC+100</b>	
Hot plug-in modules	Yes	
Front panel removable modules	Yes	
<b>Power Supply</b>	<b>MGC+50</b>	<b>MGC+100</b>
AC Input	100-240 VAC, 50/60 Hz	100-240 VAC, 50/60 Hz

Table 1-1: MGC+ Specifications

Power Consumption	MGC+50	MGC+100
AC Maximum Power consumption	AC Voltage - 10Amp at 100 VAC, 5 Amp at 240 VAC protected by a 15 Amp circuit breaker.	AC Voltage - 15 Amp at 100 VAC and 7.5 Amp at 240 VAC protected by a 15 Amp circuit breaker.

## MGC+ Control Unit

A new Control unit is located in Slot A of the front panel of the MGC+.

The Control Unit has the following features:

- Support of both XPEK and pSOS Operating Systems (OS)
- XPEK or pSOS swappable Operating Systems (OS)
- MGC Manager Version 7.0x
- External IDE Compact Flash
- 40 GB Hard Drive
- USB port
- CCOM, revision version 5
- New Rear Access I/O

## Scope of Manual

This manual describes the MGC+50 and the MGC+100 hardware and installation procedure. It is intended for service engineers, system administrators and system operators who need to install, configure and maintain the MGC+ unit.

Detailed information on using the system, including starting and shutting down the system, is provided in the MGC+ Manager User's Guide.

This manual assumes the user has the following knowledge:

- Familiarity with Windows 2000®, Windows NT®, and Windows XP® environment and interface
- Basic knowledge of videoconferencing concepts and terminology

The MGC+ Hardware and Installation Manual includes the following topics:

- **Chapter 1 - Before You Begin**  
Provides a general description of the MGC+ unit, its main features and description of the MGC+ Hardware and Installation Guide.
- **Chapter 2 - Hardware Description**  
This chapter includes the Descriptions of the MGC+50/MGC+100 front panel, back panel, and functional modules.
- **Chapter 3 - System Architecture**  
Describes the system architecture and the data flow.
- **Chapter 4 - Hardware Description**  
Describes the various components that make up the MGC+ unit.
- **Chapter 5 - Maintenance**  
Describes the controls and LED indicators and provides maintenance procedures.
- **Appendix A - Interfaces Pin Assignment**  
Describes the pinout of the various MGC+ unit connectors.



## Conventions

Before using this manual, it is important for you to understand the terms and conventions used:

- The term “Choose” or “Double-click” is used when you need to activate a menu command or a command button in the dialog box.
- The term “Select” or “Click” is used to highlight a part of the window, dialog box or menu that you want to be changed with your next action.
- The term “Right-click” is used when you press and release the right mouse button to open a pop-up menu.
- The term “Choose OK” means that you can either click the OK button with the mouse, or press the <Enter> key on the keyboard.
- Keyboard keys appear in capital letters, between these two symbols < >. For example, the Shift key appears as <Shift>.
- The plus sign (+) between two key names indicates that you must press and hold down one key while pressing down the second key. For example, “press <Alt>+<P>” means that you press and hold down the Alt key while you press the P key.
- **Bold** type appearing in the text, or in a procedure indicates the word or the character that you should type into a text box from the keyboard. It is also used to indicate the name of the menu name or command name that you should select.
- *Italic* type appearing in the text or in a procedure indicates the menu name, dialog box name or field name from which an option should be selected or into which parameters should be entered.
- Tips and notes appear in a different typeface and between two bars. For example:



This is an example of notes that you may encounter throughout this Hardware Manual.

## List of Abbreviations

The following is the list of abbreviations used throughout this manual:

*Table 1-2: Abbreviations*

API	Application Programming Interface
CSU	Channel Service Unit
DPR	Dual Port Ram
ESD	Electro-Static Discharge
HDLC	High-level Data Link Control
HSD	High Speed Data
IP	Internet Protocol
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LED	Light Emitting Diode
LSD	Low Speed Data
MCU	Multipoint Control Unit
MGC+	Multimedia Gateway Control
MPI	Multi Protocol Interface
MUX	Multiplexor
PBX	Private Branch Exchange
PRI	Primary Rate Interface
TCP	Transmission Control Protocol
TDM	Time Division Multiplexing

## Installation and Configuration Workflow

The MGC+ unit installation and configuration process includes the following main steps: Hardware Installation, Software Installation, Network Services definition and the MGC+ unit cards configuration, and Database Configuration. The hardware and software installation, initial IP configuration and Network Services definition stages are described in the MGC+ Getting Started Guide. The installation and configuration steps and their description are detailed in the following flowchart.

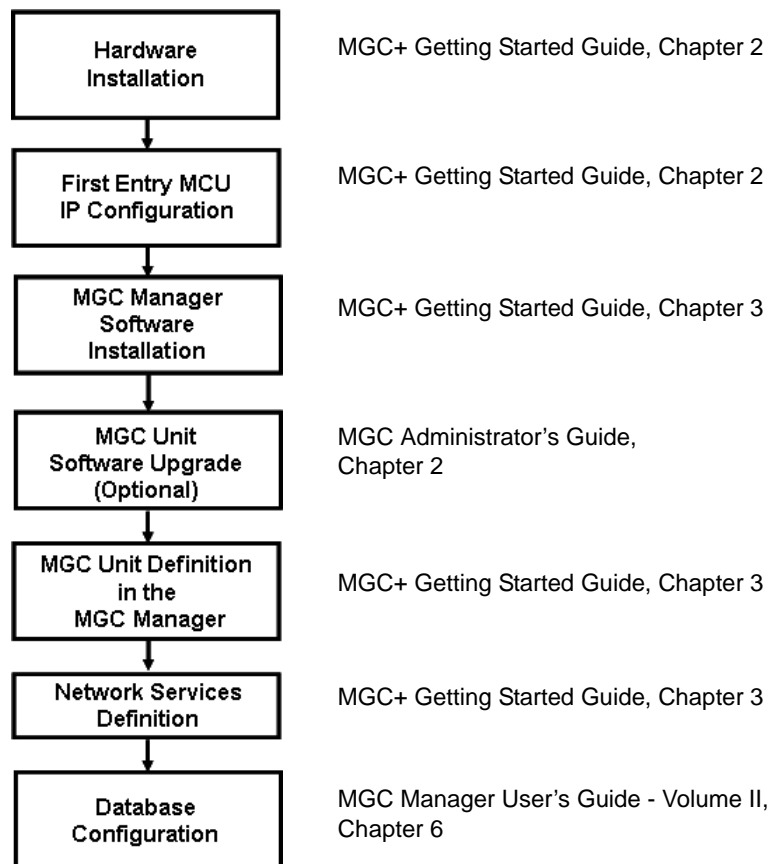


Figure 1-3: Installation and Configuration Workflow



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# Hardware Installation

This chapter describes the unpacking and connection of both the MGC+50 and the MGC+100, to the ISDN, T1-CAS, H.323, MPI or serial network to the operator workstation (PC).

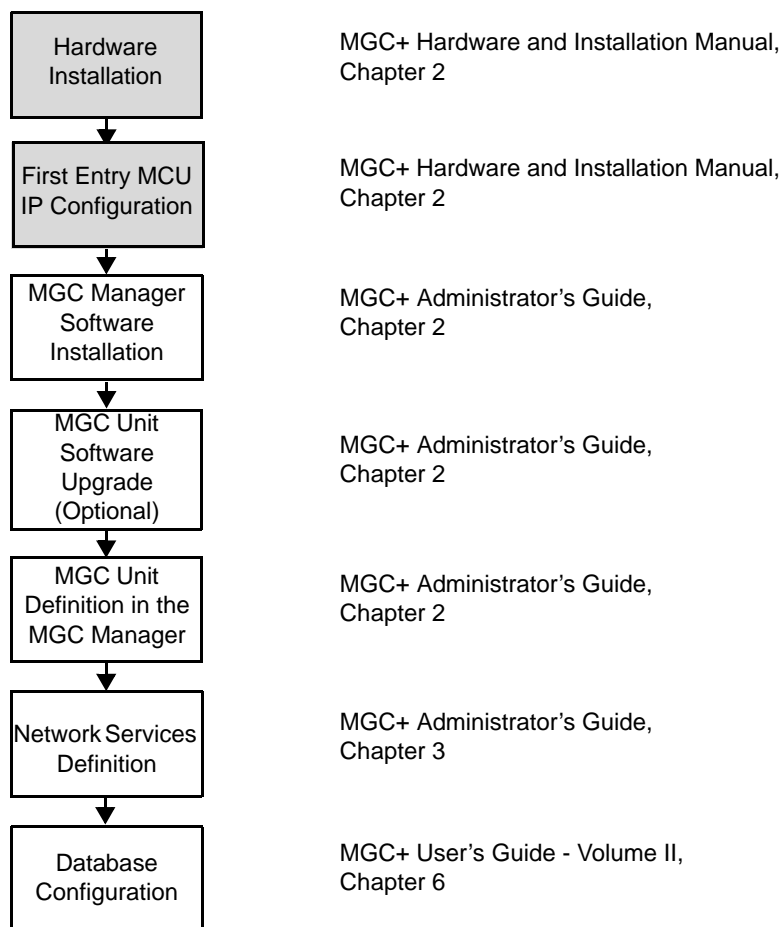


Figure 2-1: Installation and Configuration Workflow - Hardware Installation

# MGC+100 Hardware Installation

## Inspecting the MGC+/ReadiManager IAM Package Contents

You should inspect the shipped box and note if it was damaged in any way. If the box items show damage, you should file a damage claim with the carrier who delivered it.

When deciding on a setup location for the MGC+, refer to the section “System Safety” on page 2-2.

### **Disclaimer**

Polycom is not responsible for damage sustained during shipment of this product.

## System Safety

This section includes the follow topics related to system safety:

- “General Safety Precautions” on page 2-2
- “Rack Mount Safety Precautions” on page 2-3
- “Polycom MGC+/ReadiManagerReadiManager Precautions” on page 2-3

## General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the Polycom ReadiManager clean and free of clutter.
- The MGC+50 weighs approximately 24 kg (53 lbs) and the MGC+100 weighs approximately 48 kg (106 lbs). When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

## Rack Mount Safety Precautions

The following precautions should be followed with regards to rack mount safety:

- Decide on a suitable location for the equipment rack that will hold the MGC+/ReadiManager unit. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet.
- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.
- Before you install the rails, determine the placement of each component in the rack.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Allow the power supply units to cool before touching them.
- Always keep the rack's front door and all the blade's panels and components closed when not servicing, to maintain proper cooling.

## Polycom MGC+/ReadiManager ReadiManager Precautions

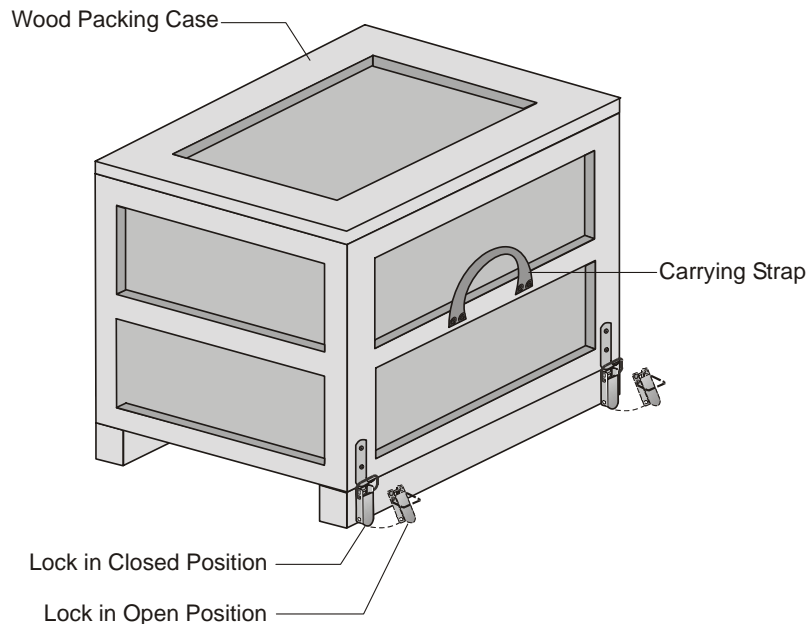
The following precautions should be followed with regards to installation of the ReadiConvene:

Use a regulating uninterruptable power supply (UPS) to protect the MGC+ from power surges and voltage spikes, to keep your MCU and ReadiManager IAM operating in case of a power failure.

## Unpacking and Positioning the MGC+100

To unpack and position the MGC+100:

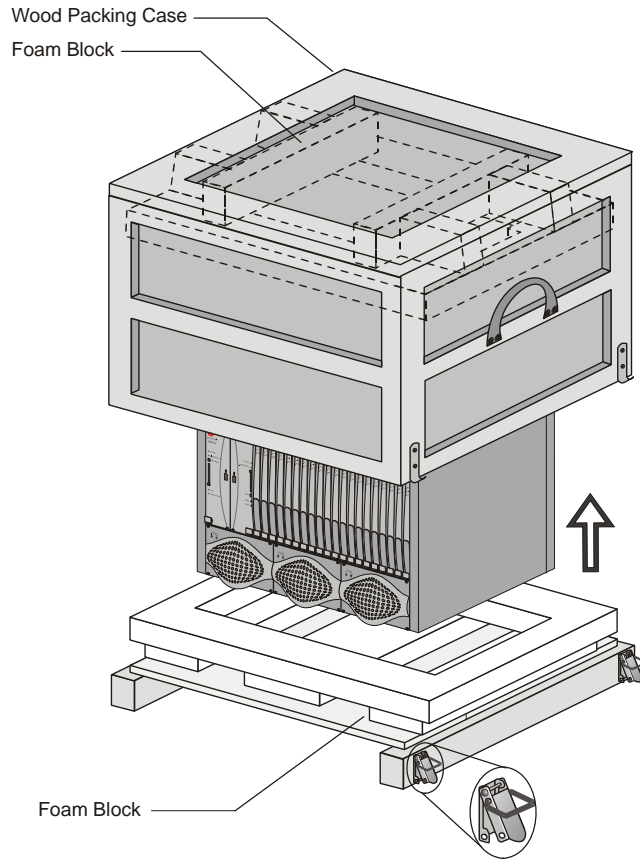
1. When you receive your MGC+100, inspect the equipment for damage and verify that the components match the packing slip. If you did not receive a component or if there is damage to the system, notify your service representative immediately.



*Figure 2-1: MGC+100 package*

2. Place the MGC+100 unit on a stable flat surface in a location that meets the MGC+ environment requirements, which are:
  - Operating temperature: 10°–40°C (50°–104°F) or 10°–35°C (50°–95°F) when installed in a 19" rack
  - Humidity: 15%–90% non-condensing
  - Altitude: Up to 3,000m (10,000ft)
  - ESD: +8 kV
3. Release the clasp locks at the bottom, and lift the MGC+100 top cover.





*Figure 2-2: Unpacking the MGC+100*

4. Lift the MGC+100 unit and remove the packaging material.
5. Lower the MGC+100 unit, placing it on the surface.  
If the MGC+100 is a standalone unit, place it on a flat surface. If you are rack mounting the MGC+100, allow a minimum clearance of 3" above the unit.

## Mounting the MGC+100 on a 23" Rack

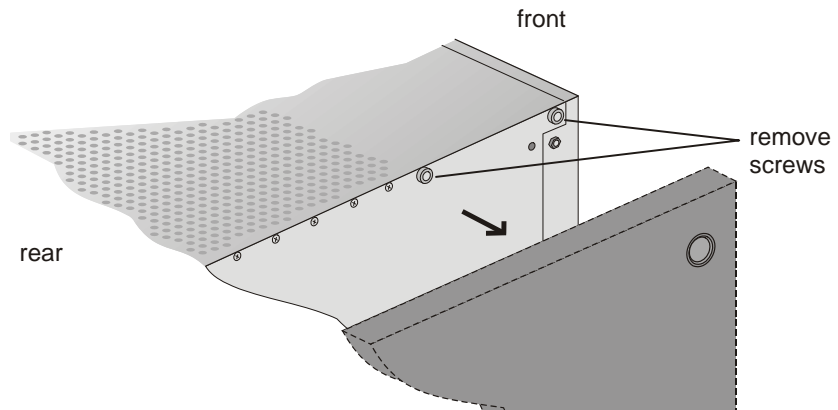
The MGC+100 can be mounted to a 23" rack using the two mounting plates that are pre-installed on the unit.

1. Make sure that the MCU is turned OFF and it is disconnected from the AC power.
2. Place the MCU in a 23" rack and support it, screw the mounting brackets to the rack securing it with bolts and self-locking nuts (which the client provides).

-or-

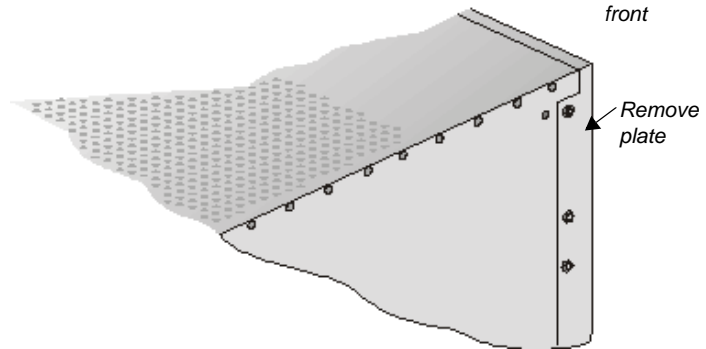
If the MGC+100 was shipped without the two mounting plates that are usually pre-installed:

3. Make sure that the MCU power is turned OFF and that it is disconnected from the AC power.
4. With a slotted screwdriver remove the five nylon plug hole covers from the MCU side covers.
5. With an Allen wrench (M4), remove the five screws from the MCU side covers.
6. Remove both MCU side covers.

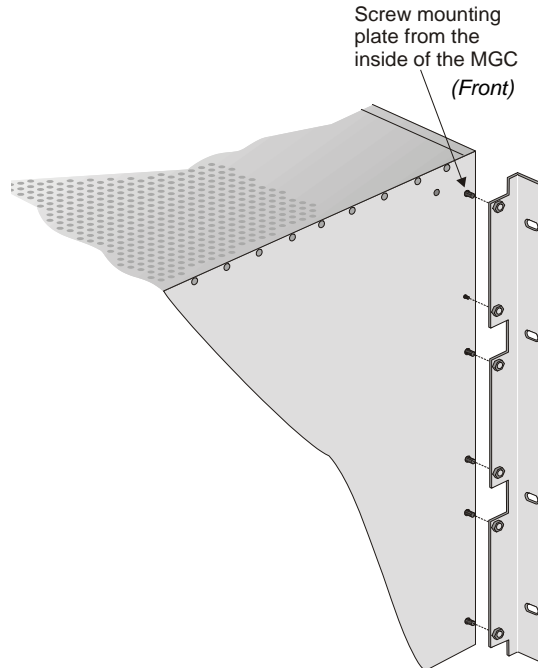


7. Remove the plates from the both sides of the MGC by removing the appropriate number of functional modules to allow access to the screws.

8. Unscrew both MCU the side screws and remove both side plates.



9. From the inside of the MGC-100, screw the mounting brackets to both sides of the MCU, securing the screws in the mounted bracket.



10. Place the MCU in a 23" rack and while supporting it, screw the mounting brackets to the rack securing it with bolts and self-locking nuts.



When the unit is installed on a rack, the rack must be properly grounded to the central office ground. The rack must be grounded with two-hole compression-type connectors using copper conductors (tinned or untinned). Wire, bus bar or braided strap connectors are acceptable.

## Mounting the MGC+100 on a 19" Rack

The MGC+100 can be mounted in a 19" rack using the mounting kit (P/N-KIT2026A). It is highly recommended that the 19" rack be located in an air-conditioned room.



When the MGC+100 unit is installed on a 19" rack, environment temperature should not exceed 35°C or 95°F.

Figure 2-3 shows how to mount the MGC+100 on the 19" rack.

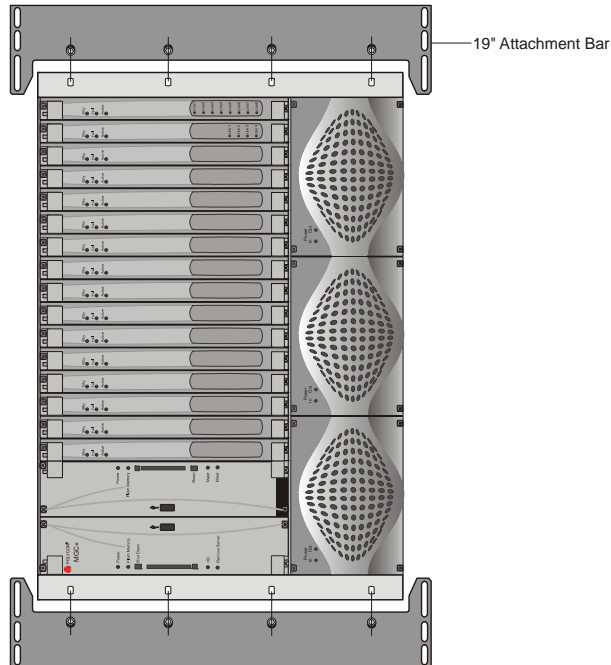


Figure 2-3: MCU Rack Mount



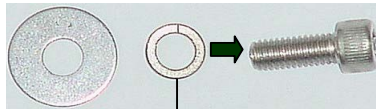
Because of heat considerations, the MCU must be installed with the Control Unit Module placed on the left bottom.

1. Check that all the parts are in the kit.  
The kit should contain the following items:

*Table 2-1: 19" Rack Mounting Kit*

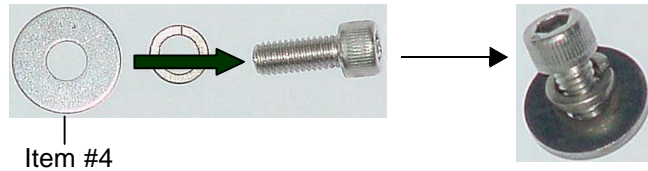
Item #	Polycom P/N	Description	Quantity
1	MEC2063A	23" TO 19" Mounting Bar MGC+100 at 90 Degrees	2
2	SCR2005A	Screw 10-32 x 1/2" Allen S/H ST/ST	8
3	WAS2003A	Washer M5 Spring Latch Loc. ST\ST	8
4	WAS2004A	Washer M5 Flat ST/ST	8

2. Make sure that the MCU power is turned OFF and it is disconnected from the AC power.  
Remove the side covers as described on page 2-4.
3. If the MCU is a standalone unit, you must first remove the side covers, and add the mounting brackets to a 23" rack (see pages 2-4 to 2-6).
4. Attach the two mounting bars to the MCU as follows:
  - a. Fit the spring washer (Item #3) onto the screw (#2).



Item #3

- b. Fit the flat washer (Item #4) onto the screw.



- c. Take the two mounting bars (Item #1) from the kit and attach them to the MGC+100 unit with the screws (with the attached washers, as described in step b).
5. Carefully rotate the MGC+100 counterclockwise 90°, making sure the Control Unit is at the bottom left.
6. While supporting the MGC+100, place it on the 19" rack and screw the brackets to the rack, securing it with the screws and nuts supplied with the rack.

# Installing the ReadManager IAM in the MGC+ Unit

This section is relevant only to MGC+ systems that are being upgraded to the ReadManager by installing the ReadManager IAM blade.

## Inspecting the MGC+ ReadManager Server

The MGC+ ReadManager Server can be shipped in two different ways:

- The MGC+ ReadManager Server pre-installed on the MGC+
- The MGC+ ReadManager Server Upgrade Package

You should inspect the box that it was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

### **Contents of the MGC+ ReadManager Server pre-installed on the MGC+**

The ReadManager Server and I/O are pre-installed on the MGC+ unit. The documentation package provided includes:

- ReadManager Installation & Documentation CD
- ReadManager Getting Started Guide and MGC Manager manuals

### **Contents of the MGC+ ReadManager Server Upgrade Package**

The MGC+ ReadManager Server Upgrade package should contain the following:

- ReadManager Server blade (requires installation from the front of MGC+)
- Server I/O (requires installation from the rear of MGC+)
- ReadManager Installation & Documentation CD
- ReadManager Getting Started Guide and MGC Manager manuals

### MGC+ ReadiManager Installation

The ReadiManager IAM can be installed with the MGC+ unit ON or OFF. Refer to Table 2-2 on page 2-12 for more detailed instructions.



It is important that you follow the sequence of steps as defined in sections below.

*Table 2-2: MGC+ Power Setting During ReadiManager IAM Blade Installation*

<b>MGC+ Power Setting</b>	<b>Do This</b>
OFF	<ol style="list-style-type: none"><li>1 Make sure the MGC+ is turned OFF.</li><li>2 Remove the blank panel from the front of the MGC+ unit. (This is where the ReadiManager IAM will be inserted.) See "Removing the Blank Panel from the MGC+ Unit" on page 2-14.</li><li>3 Remove the rear I/O panel and install the I/O card on the chassis. See "Installing the I/O Card for the ReadiManager IAM" on page 2-15.</li><li>4 Install the ReadiManager IAM. See "Inserting the ReadiManager IAM into the MGC+ Unit" on page 2-16.</li><li>5 Turn ON the Power switch on the MGC+.</li></ol>



Table 2-2: MGC+ Power Setting During ReadManager IAM Blade Installation

MGC+ Power Setting	Do This
ON	<ol style="list-style-type: none"> <li>1 Remove the rear I/O panel and install the I/O card on the chassis. See "Installing the I/O Card for the ReadManager IAM" on page 2-15.</li> <li>2 Remove the ReadManager IAM front panel. See "Removing the Blank Panel from the MGC+ Unit" on page 2-14.</li> <li>3 Install the ReadManager IAM. See "Inserting the ReadManager IAM into the MGC+ Unit" on page 2-16. The ReadManager IAM automatically starts/boots when inserted into its slot on the backplane.</li> </ol> <p><b>Note:</b> If you did not follow this procedure and installed the ReadManager IAM prior to installing the I/O card for the ReadManager IAM, then:</p> <ol style="list-style-type: none"> <li>4 Turn the ReadManager IAM OFF, by pushing the <i>SHUT Down</i> button.</li> <li>5 Turn the ReadManager IAM ON, by pushing the <i>SHUT Down</i> button again.</li> </ol>

## Removing the Blank Panel from the MGC+ Unit

### To remove the blank panel from the front of the MGC+ unit:

1. Remove the left panel (labelled *MGC+*) from the front of the MGC+ unit.
2. Unscrew four screws as shown in the following illustration.



When power on the MGC+ is turned ON, you must install the I/O card for the REDIManager IAM card before installing the REDIManager IAM.

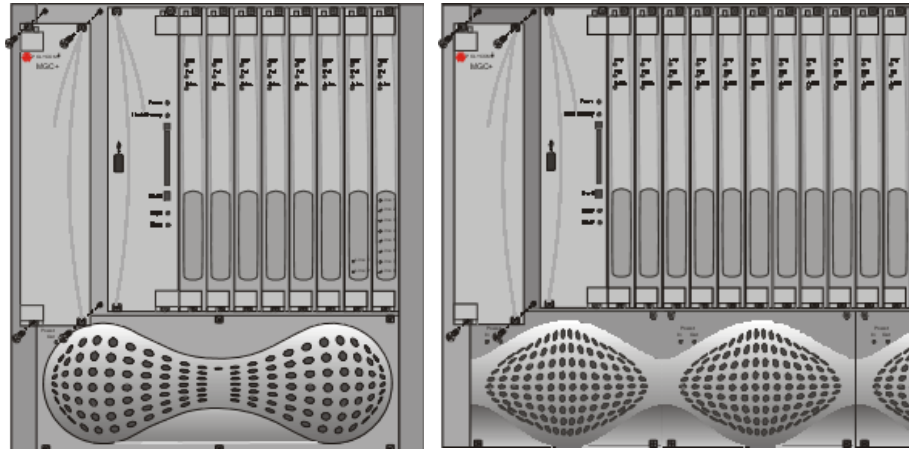


Figure 2-4: MGC+ 50/100 front panels removed

## Installing the I/O Card for the RediManager IAM

### To install the I/O card for the RediManager IAM:

1. Remove the right rear I/O cover by loosening the four screws as shown in the following illustration.

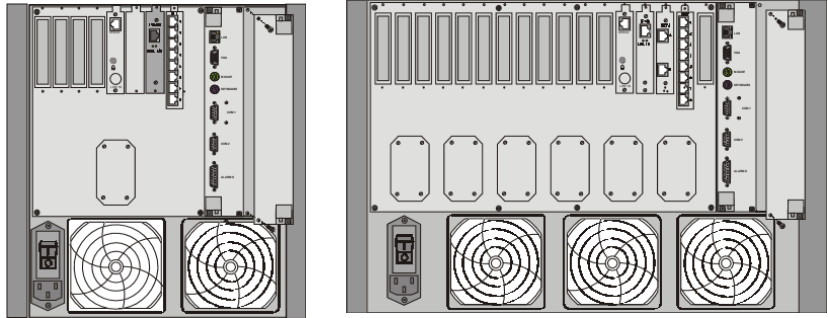


Figure 2-5: MGC+ 50/100 rear panel detachment

2. Remove the I/O card for the RediManager IAM from its package and insert it in its slot as shown in the following illustration.

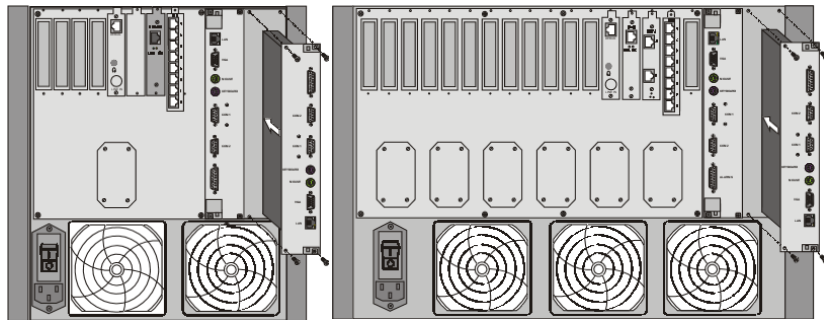


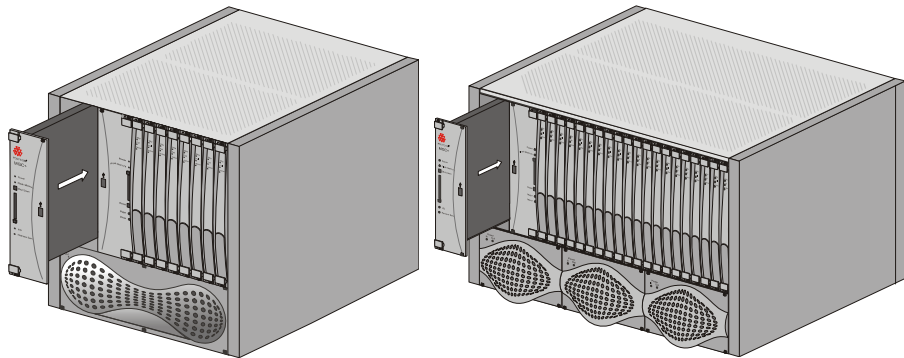
Figure 2-6: MGC+ RediConvene IAM rear I/O Insertion

3. Push the I/O card firmly into the MGC+ backplane. Make sure its is properly seated in its slot.
4. Tighten the four screws that secure the I/O card to the MGC+ chassis.
5. Attach the required cables or connections to the I/O card for the RediManager IAM.

## Inserting the ReadiManager IAM into the MGC+ Unit

### To insert the Polycom ReadiConvene IAM blade:

1. After removing the left front panel from the MGC+ chassis, unpack the ReadiManager IAM.
2. Insert the ReadiManager IAM into its slot and carefully slide it firmly into the backplane, making sure that it is properly seated in its slot.



*Figure 2-7: ReadiManager IAM insertion on the MGC+ unit*

Tighten the four screws, securing the ReadiManager IAM to the MGC+ chassis.



When power on the MGC+ is ON, the ReadiManager IAM automatically boots when it is inserted into its housing on the backplane. For more information see Table 2-2 on page 2-12.

# Connecting and Setting Up the MGC+100

Use the MGC+100 rear panel diagram below for reference.

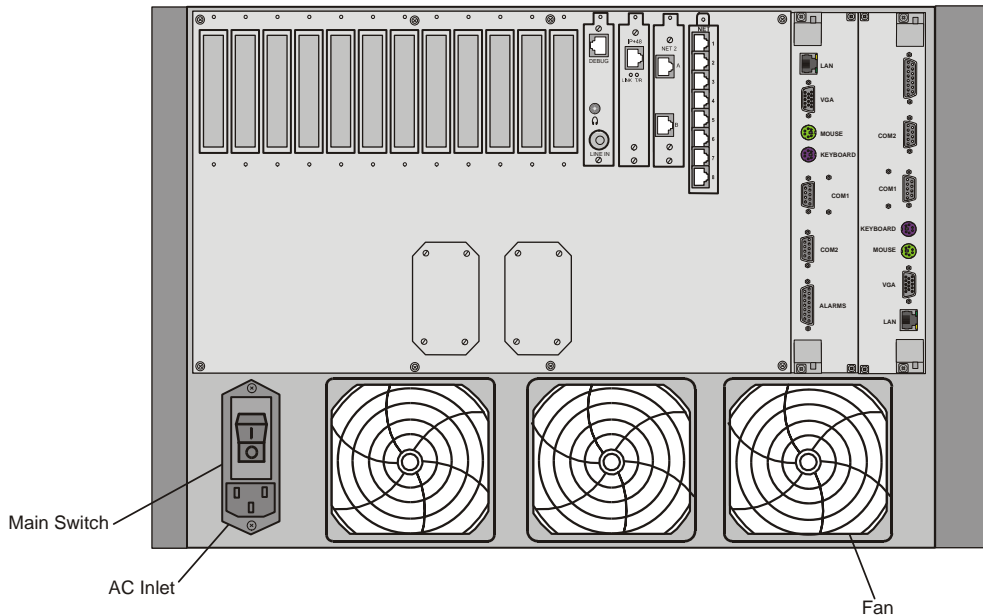


Figure 2-8: MGC+100 Rear Panel with External Connectors

**To Connect the MGC+100 to the network and power source and set up the system the following procedures are performed:**

- Connecting the MGC+ unit to the power source (AC inlet)
- Connecting the MGC+ unit to the LAN Network
- Connecting the MGC+ unit to the Operator Workstation (PC) directly via RS-232 (optional) using COM2
- Connecting the MGC+ unit to the network(s)

## MGC+100 Dongle

MGC+100 is shipped with a serial dongle and is installed on COM1 of the Control Module rear I/O panel. A special bracket ensures that the dongle remains in its fixed position. The dongle is required for normal operation of the MCU. If the dongle is missing, please contact support.

### Connecting to the power source

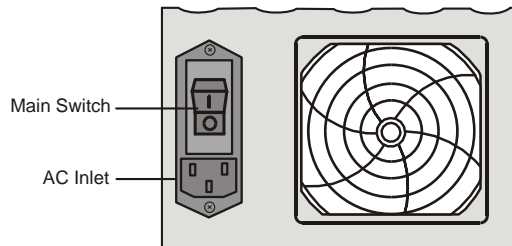
You can connect to an AC Inlet power supply at your site. It is important to follow these steps.

The following restrictions apply to the conductors and connectors that may be used to ground the unit when rack mounted:

- When using bare conductors, they must be coated with an appropriate antioxidant compound before crimp connections are made. Tinned, solder-plated or silver-plated connectors do not have to be prepared in this manner.
- The same bolt assemblies should not secure multiple connectors.
- Listed fastening hardware must be compatible with the materials being joined and must be preclude loosening, deterioration and electrochemical corrosion of the hardware and joint materials.

#### To connect to the AC Inlet:

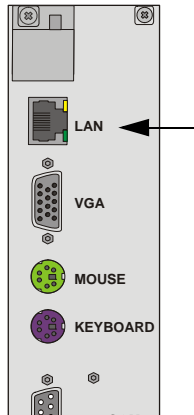
1. Make sure the power switch is OFF. Insert the power cable into the power connector on the rear panel of the MGC+100 unit.



2. Insert the power cable into the power source socket.
3. Turn on the power by pressing on the power switch located on the rear panel of the MGC+100 unit.

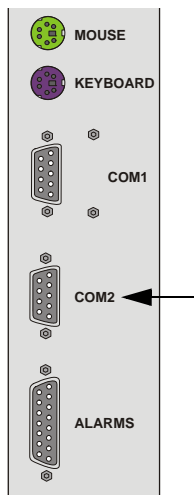
### Connecting the MGC+100 to the LAN Network

Connect one end of a network cable to the LAN connector on the rear I/O panel of the MGC+100 Control Module and the other end to the network.



### Connecting the MGC+100 to the Operator Workstation (PC) Directly via RS-232 (Optional)

Connect one end of an RS-232 cable to the COM2 connector on the rear panel of the MGC+100 Control Module and the other end to the serial port of the operator station (see RS-232 Pin Assignment, A-3).



## Connecting the MGC+100 to the Network

### To connect the MGC+100 to the ISDN network or T1-CAS Network:



The ISDN network is optional. If the MGC+100 has to be connected to the public ISDN network then an external CSU or similar equipment is needed. T1-CAS network is optional. It allows you to connect Audio Only participants to conferences via T1-CAS lines. It uses the same network connections as ISDN and the procedure described below is applicable to both ISDN and T1-CAS lines.

- Connect the 8-pin RJ-45 connector of the network cable to the NET RJ-45 jack on the rear panel of the MGC+100. Repeat this step for each of the ISDN network lines to be connected to the Network Interface card installed in the MCU.

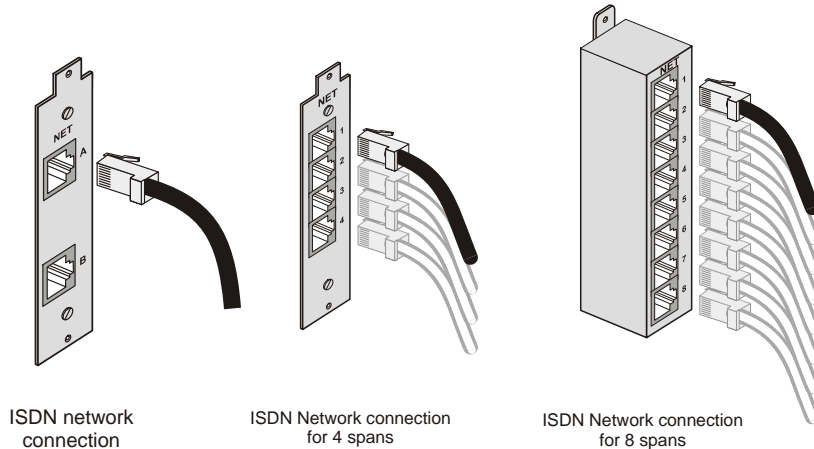


Figure 2-9: ISDN network connection

Leased lines should be connected using an adapter with a screw connector with solid conductor wires or a similar adapter.

- Connect one side of the adapter to the NET RJ-45 jack on the rear panel of the MGC+100. Then connect the leased line wires to the other side of the adapter.



The ISDN and T1-CAS network properties must be defined in the Network Services. For details, see the MGC+ Administrator's Guide, Chapter 3.



**To connect the MGC+100 to the H.323 network:**

If an H.323 network Interface card is installed in the MGC+100, connect the 8-pin RJ-45 connector of the LAN network cable to the LAN-323 RJ-45 jack on the rear panel of the MGC+100.

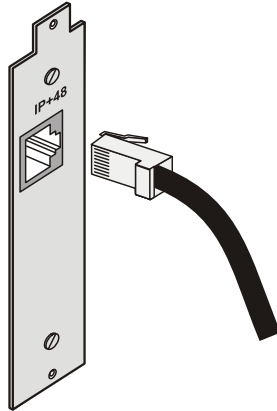


Figure 2-10: LAN H.323 network connection



The H.323 network properties must be defined in the Network Services, For details, see MGC+ Administrator's Guide, Chapter 3.

## MPI-4/8 Hardware Installation for the MGC+100

The MPI-4/8 (Multi Protocol Interface) Network Interface card is inserted into the MGC+100 unit.

The MPI box may be mounted on top of the MGC+100 using mounting brackets, or on a separate 19" or 23" rack, as can be seen in Figure 2-7. When installed on a 19" rack, the MPI box can be mounted directly on the rack. When installed on a 23" rack, a mounting plate must be used. If the MGC+100 is rack mounted, there must be at least 6" free space above the MGC+100 to be able to install the MPI Box on top of the MGC+ unit.

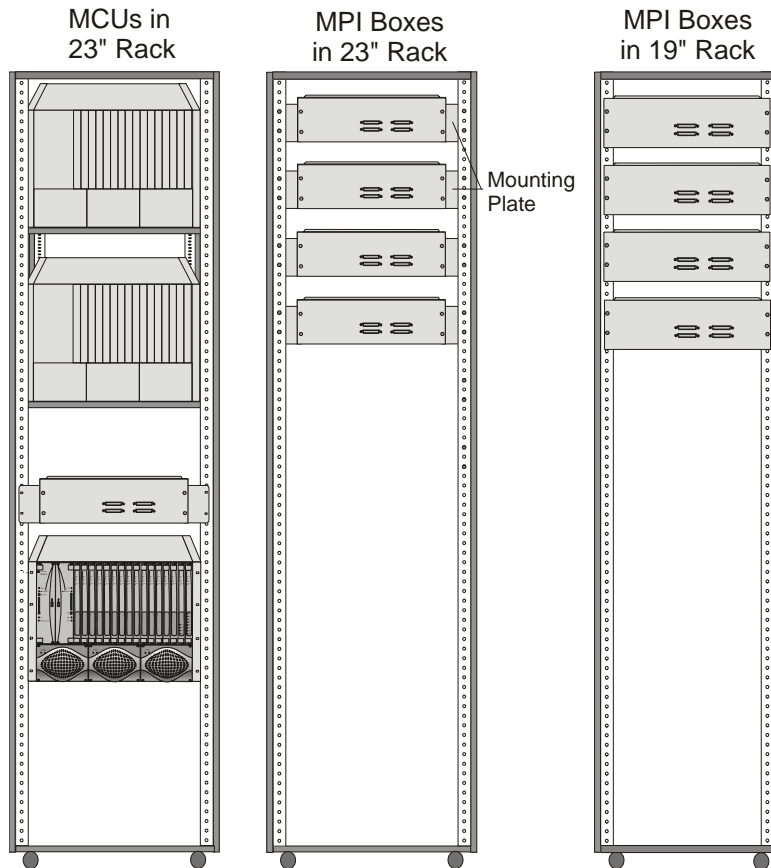


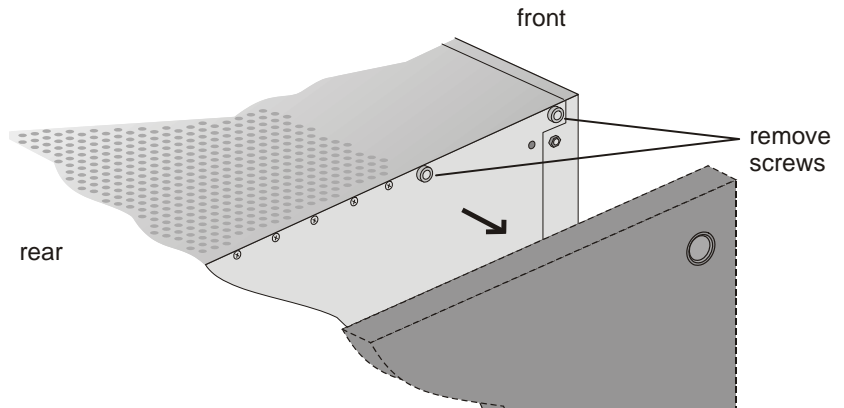
Figure 2-11: MPI Box rack mounting options

**To install the MPI-4/8 Network Interface Module:**

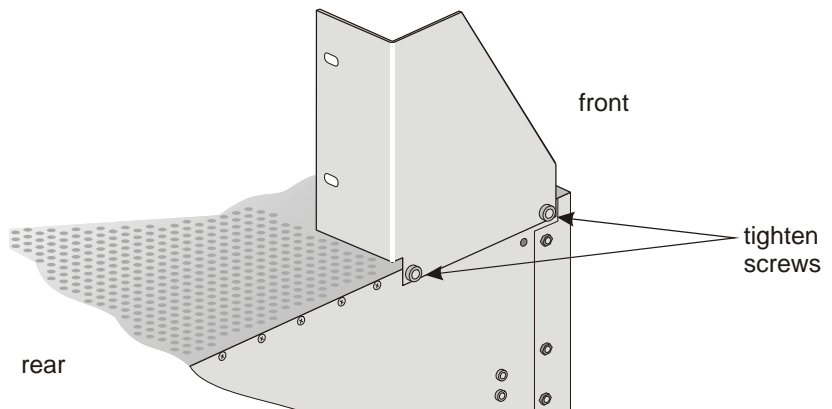
1. Slide the MPI-4/8 Network Interface module into a free slot in the MGC front panel.
2. Push the MPI-4/8 Network Interface module firmly into the Backplane, making sure it is properly seated in its slot.
3. Tighten the screws on the front panel of the MGC-100 that secure the MPI-4/8 Network Interface module.

**To install the MPI Box on Top of the MCU:**

1. Turn OFF power to the MCU and unplug it from AC power.
2. If the MCU is rack mounted, disconnect all the external cables, dismount the MCU from the rack and place it on a desktop or work table.  
If it is a standalone unit, remove the MCU side panels.
3. Remove the two Phillips screws on each side of the MCU (near the rear panel).

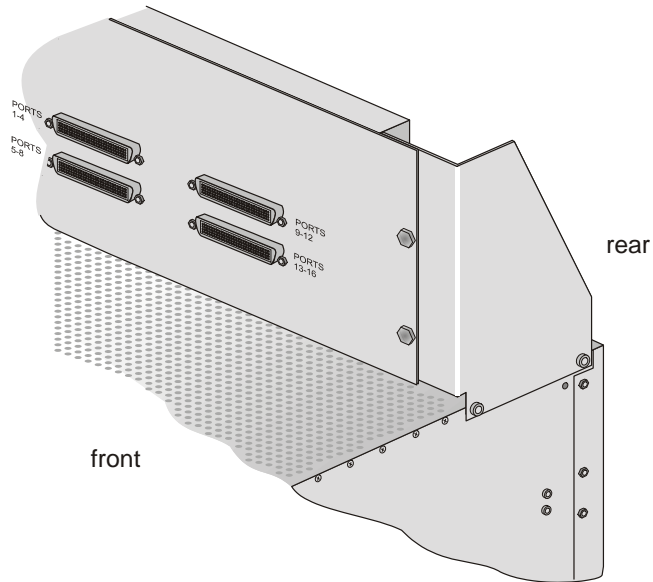


4. Place the mounting bracket on top of the MCU aligning it against the screw openings as shown below and tighten the screws.

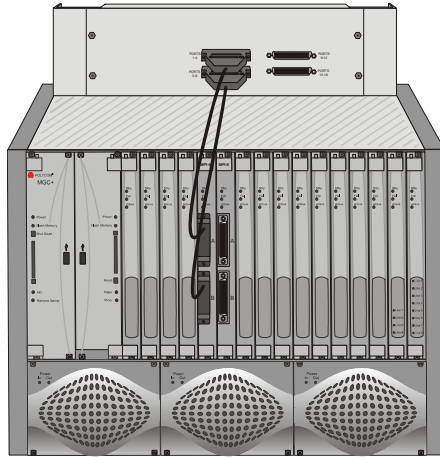


5. Mount the bracket on the other side of the MCU (repeat step 4).

6. Place the MPI box with its four 160-pin connectors facing the MCU front panel between the two mounting brackets. Secure it with the screws supplied with the MPI Box.



7. If the MCU is standalone, reassemble the side panels.  
If the MCU is rack mounted, mount the unit on the rack and connect all the external cables.
8. Using the cable provided with the MPI kit, connect the 160-pin connector to Port A of the MPI-8 Network Interface front panel. Connect the other end of the cable to a (Ports 1-4) 160-pin connector of the MPI Box; by doing this procedure we have utilized the MPI Box as a MPI-4.
9. Using a second cable, connect the angled 160-pin connector to Port B of the MPI-8 Network Interface front panel. Connect the other end of the cable to B (Ports 5-8) 160-pin connector of the MPI Box. Using this procedure we have utilized the MPI Box as a MPI-8.



10. Connect the serial cable running from the DCE to the appropriate 37-pin connector on the rear panel of the MPI Box. If dialing is used, connect the appropriate cable from the DCE to the 25-pin connector on the rear panel of the MPI Box.

Whenever the MGC+ unit is used as a DCE and connected straight to an endpoint the serial data stream flows from the endpoint (DTE) through the serial connector to the MPI box. The connections stay the same, meaning; the endpoint is connected to the back of the MPI box by way of the 37-pin connector, and the other side of the MPI box is then connected by way of the 160-pin connector to the MPI card in the MGC+ unit.



- If V.35 or RS-530 cable is used, attach the special adapter (provided with the kit) to the 37-pin prior to connecting the serial cable from the DCE.
- The serial (MPI) network properties must be defined in the Network Services, For details, see MGC+ Administrator's Guide, Chapter 3.

# MGC+50 Hardware Installation

## Unpacking and Positioning the MGC+50

### To unpack and position the MGC+50:

1. When you receive your MGC+50, inspect the equipment for damage and verify that the components match the packing slip. If you did not receive a component or if there is damage to the system, notify Polycom immediately.

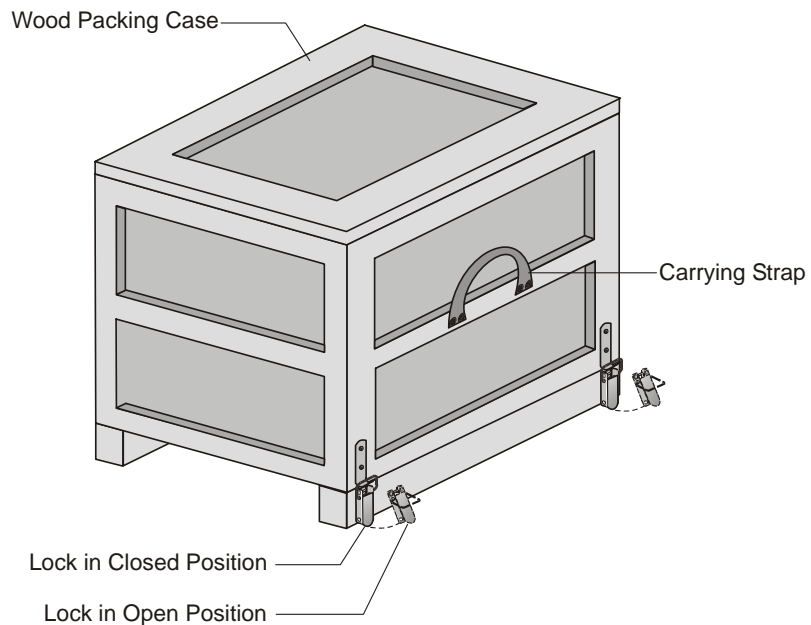
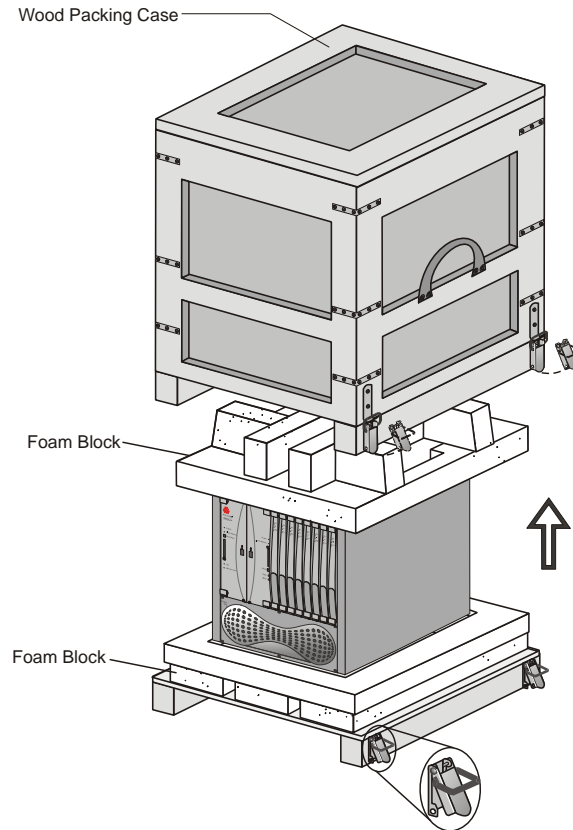


Figure 2-12: MGC+50 package

2. Place the MGC+50 unit on a stable flat surface in a location that meets the MGC+50's environment requirements, which are:
  - Operating temperature: 10°–40°C (50°–104°F)
  - Humidity: 15%–90% noncondensing
  - Altitude: Up to 3,000m (10,000ft)
  - ESD: +8 kV

3. Release the clasp locks at the bottom, and lift the MGC+50 top cover.



*Figure 2-13: Unpacking the MGC+50*

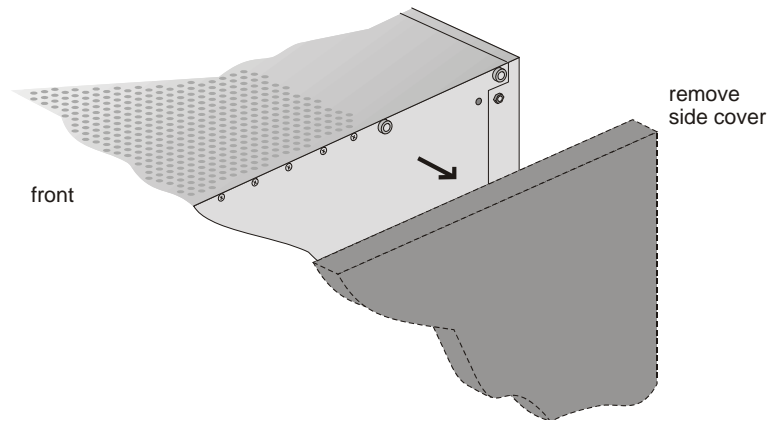
4. Lift the MGC+50 unit and remove the package base.
5. Lower the MGC+50 unit, placing it on the surface.  
If you are rack mounting the MGC+50, allow a minimum clearance of 3 inches above the unit.

## Mounting the MGC+50 on a Rack

The MGC+50 can be mounted in a 19" rack using two mounting plates (Kit 2012A). The side plates are usually mounted when shipped, but if not, follow the directions below to install the mounted plates on the MGC+50 and then mount the MGC+50 on the 19" rack.

### To install and mount the MGC+50:

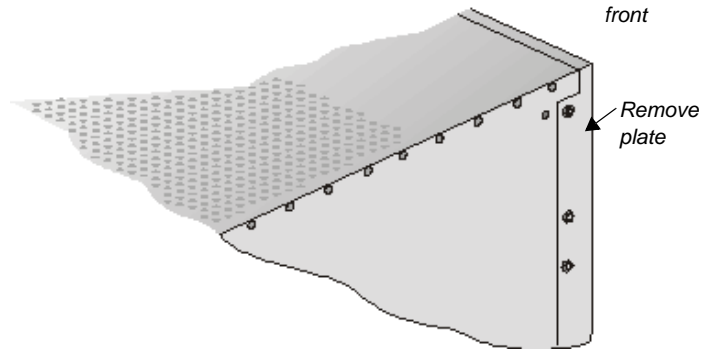
1. Make sure that the MGC+50 power is turned OFF and it is disconnected from the AC power.
2. Remove the five nylon plug hole covers from the MGC+50 protective side covers (using a slotted screwdriver).
3. Using an Allen wrench (M4), remove the five screws from the MGC+50 side covers.
4. Remove the MGC+50 side covers from both sides.



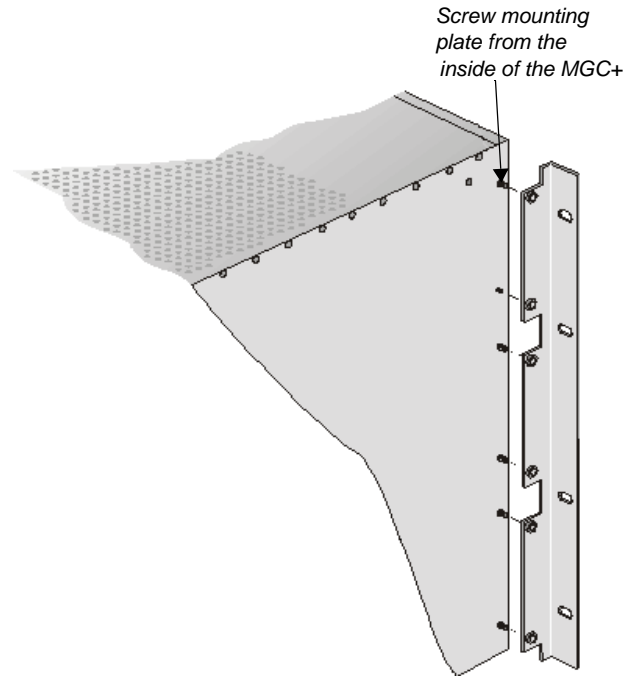
5. To remove the plate from both MGC+50 sides, the side screws have to be removed. To remove the screws from the left side of the MGC+, the Control Board, Server panel, Functional modules and power supply must be removed first. These procedures are described in Chapter 5 of this manual. For detailed procedures, see Chapter 5, "Replacing the Main Control Module" on page 5-17. For instructions on how to remove the power supply, see Chapter 5, "Replacing the Power Supply Module on the MGC+50" on page 5-11.



6. Once the, Server panel, Main Control Module, the power supply module and the boards are removed, unscrew the side screws from inside the MGC+50, and then remove the plate from both MGC+50 sides.

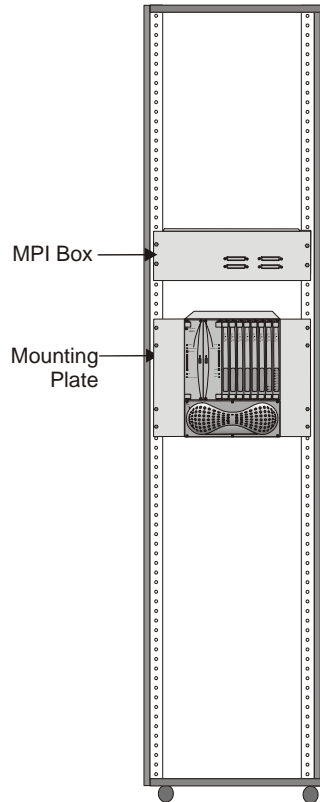


7. To remove the plate from the right side of the MGC+ unit remove the appropriate number of functional modules to allow access to the screws.
8. From the inside of the MGC+50, screw the mounting bracket to the side of the MGC+50, securing the screws in the mounted nuts.



9. Insert the functional modules removed earlier into the MGC+50.
10. Mount the Power Supply module, Main Control Module and Server panel back in their place as described in Chapter 5, "Replacing the Main Control Module" on page 5-17. Also see Chapter 5, "Replacing the Power Supply Module on the MGC+50" on page 5-11.

11. Place the MGC+50 in a 19" rack and while supporting it, screw the mounting brackets to the rack securing it with nuts.



## Connecting and Setting Up the MGC+50

Use the MGC+50 rear panel diagram below for reference.

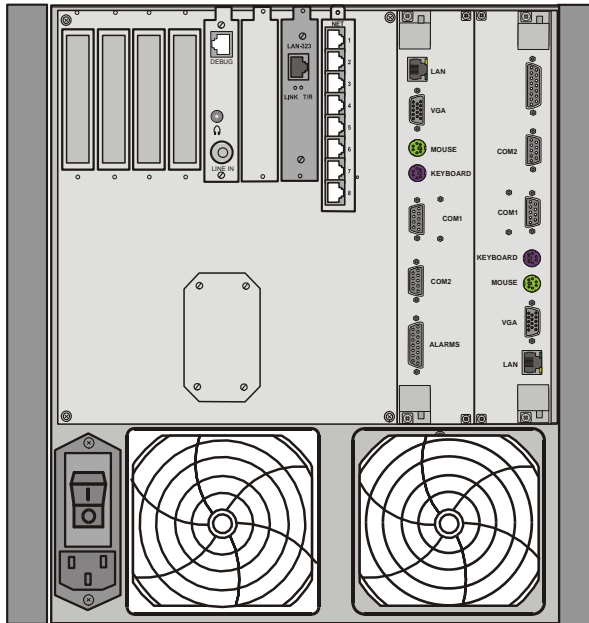


Figure 2-14: MGC+50 Rear Panel with External Connectors

To connect the MGC+50 to the network and power source and set up the system the following procedures are performed:

- Connecting the MGC+ unit to the power source (AC inlet)
- Connecting the MGC+ unit to the LAN Network (C.B., I/O)
- Connecting the MGC+ unit to the Operator Workstation (PC) directly via COM2 (optional)
- Connecting the MGC+ unit to the network(s)

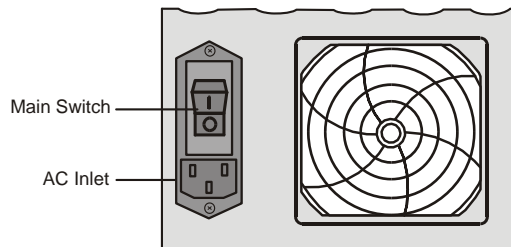
### MGC+50 Dongle

MGC+50 is shipped with a serial dongle and is installed on COM1 of the Control unit's rear I/O panel. A special bracket ensures that the dongle remains in its fixed position. The dongle is required for normal operation of the MCU. If the dongle is missing, please contact support.

## Connecting to the Power Source

### To connect to the AC Inlet:

1. Make sure that the power switch located on the rear panel of the MGC+ unit is off.
2. Insert the power cable into the power connector on the rear panel of the MGC+50 unit.



3. Insert the power cable into the power source socket.
4. Turn on the power by pressing on the power switch located on the rear panel of the MGC+50 unit.

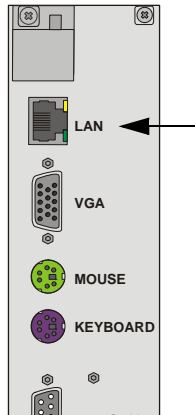
If the unit is rack mounted, the single-point ground on the MCU-50 must be connected to the rack with a single conductor and attached so that it prevents loosening.

The following restrictions apply to the conductors and connectors that may be used to ground the unit when rack mounted:

- When using bare conductors, they must be coated with an appropriate antioxidant compound before crimp connections are made. Tinned, solder-plated or silver plated connectors do not have to be prepared in this manner.
- Multiple connectors should not be secured with the same bolt assemblies.
- Listed fastening hardware must be compatible with the materials being joined and must avoid loosening, deterioration and electrochemical corrosion of the hardware and joint materials.

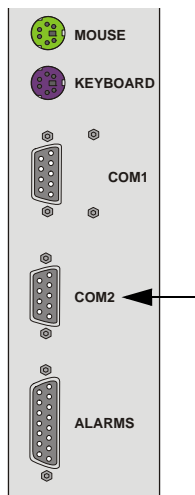
### Connecting the MGC+50 to the LAN Network

Connect one end of a network cable to the LAN connector on the rear I/O panel of the MGC+ Control Module and the other end to the network.



### Connecting the MGC+50 to the Operator Workstation (PC) Directly via RS-232 (Optional)

Connect one end of an RS-232 cable to the COM2 connector on the rear I/O panel of the MGC+ Control Module and the other end to the serial port of the operator station (See RS-232 Pin Assignment, A-3).



## Connecting the MGC+50 to the PSTN Network

### To connect the MGC+50 to the ISDN network and T1-CAS network:



This is an optional Network Interface Card. If the MGC+50 has to be connected to the public ISDN network then an external CSU or where required, similar equipment is needed.

T1-CAS network is optional. It allows you to connect Audio Only participants to conferences via T1-CAS lines. It uses the same network connections as ISDN and the procedure described below is applicable to both ISDN and T1-CAS lines.

- Connect the 8-pin RJ-45 connector of the network cable to the NET RJ-45 jack on the rear panel of the MGC+. Repeat this step for each of the ISDN network lines to be connected to the Network Interface card installed in the MCU.

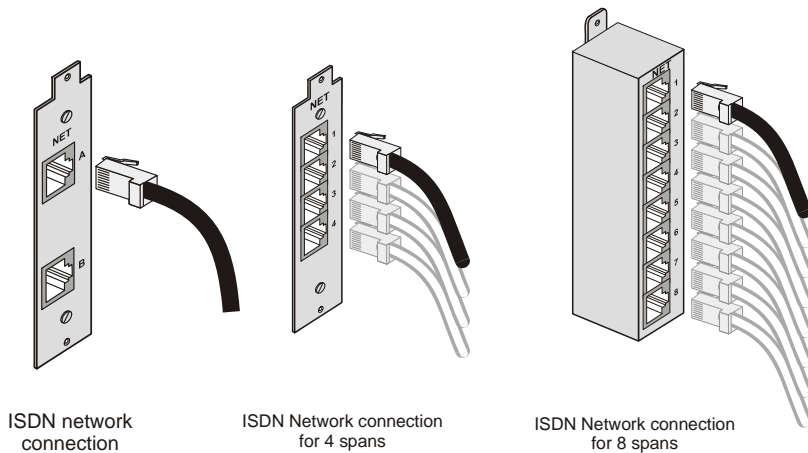


Figure 2-15: ISDN network connection

- Leased lines should be connected using an adapter with a screw connector for solid conductor wires with a diameter in the range 0.4 to 0.6 mm. Use Polycom P/N CBL0602A or similar adapter. Connect one side of the adapter to the NET RJ-45 jack on the rear panel of the MGC+. Then connect the leased line wires to the other side of the adapter.



The ISDN and T1-CAS network properties must be defined in the Network Services. For details, see the MGC+ Administrator's Guide, Chapter 3.

### Connecting the MGC+50 to the H.323 Network

If an H.323 network Interface card is installed in the MGC+, connect the 8-pin RJ-45 connector of the LAN network cable to the LAN-323 RJ-45 jack on the rear panel of the MGC+.

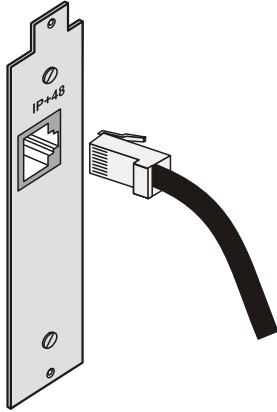


Figure 2-16: LAN H.323 network connection



The H.323 network properties must be defined in the Network Services Wizard, for details, see MGC+ Quick Start Guide, Chapter 3.



## MPI-4/8 Hardware Installation for the MGC+50

The MPI-4/8 Network Interface card is inserted into the MGC+50.

The MPI box is mounted on a 19" rack together with the MGC+50, as can be seen in Figure 2-13. The MPI box is mounted directly on the rack, above the MGC+50, leaving at least 6" free space above the MGC+50. For details, on how to mount the MGC+50, refer to the section "Mounting the MGC+50 on a Rack" on page 2-28.

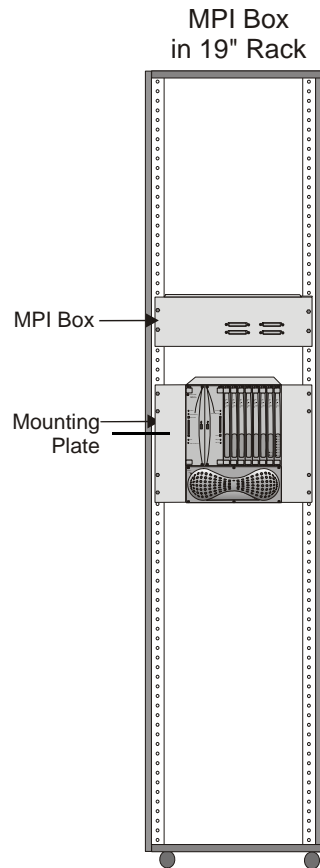


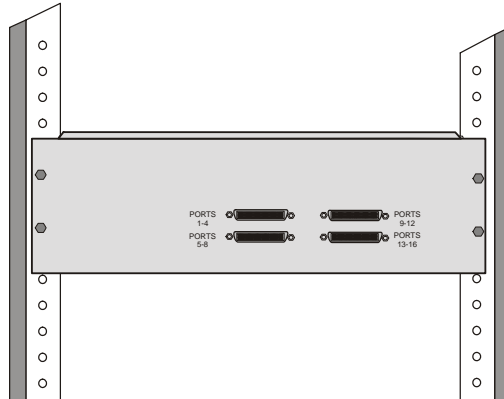
Figure 2-17: MPI Box mounting option

**To install the MPI-4/8 Network Interface Module:**

1. Slide the MPI-8 Network Interface module into a free slot in the MCU front panel.
2. Push the MPI-8 Network Interface module firmly into the Backplane, making sure it is properly seated in its slot.
3. Tighten the screws on the front panel of the MGC+50 that secure the MPI-8 Network Interface module.

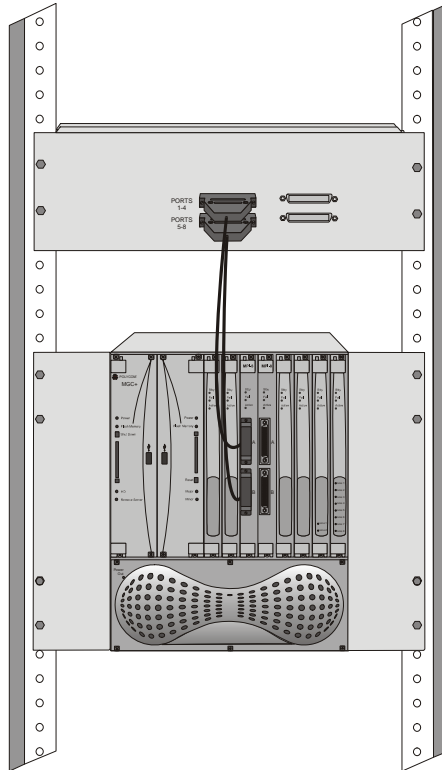
**To mount the MPI Box on the Rack for the MGC+50:**

1. Place the MPI box with its four 160-pin connectors facing the MGC+50 front panel between the two rails of the rack. Secure it to the rack with the screws supplied with the MPI Box.



2. Connect all the external cables to the MPI box:  
Using the cable provided with the MPI kit, connect the 160-pin connector to Port A of the MPI-4/8 Network Interface front panel. Connect the other end of the cable to a (Ports 1-4) 160-pin connector of the MPI Box. Again, by doing this procedure we have utilized the MPI Box as a MPI-4.

Using a second cable, connect the 160-pin connector to Port B of the MPI-4/8 Network Interface front panel. Connect the other end of the cable to B (Ports 5-8) 160-pin connector of the MPI Box. By doing this procedure we have utilized the MPI Box as a MPI-4/8.



3. Connect the serial cable running from the DCE to the appropriate 37-pin connector on the rear panel of the MPI Box (If the endpoint is a DCE, then connect this to the MPI Box. For more information, refer to chapter 4). If dialing is used, connect the appropriate cable from the DCE to the 25-pin connector on the rear panel of the MPI Box.



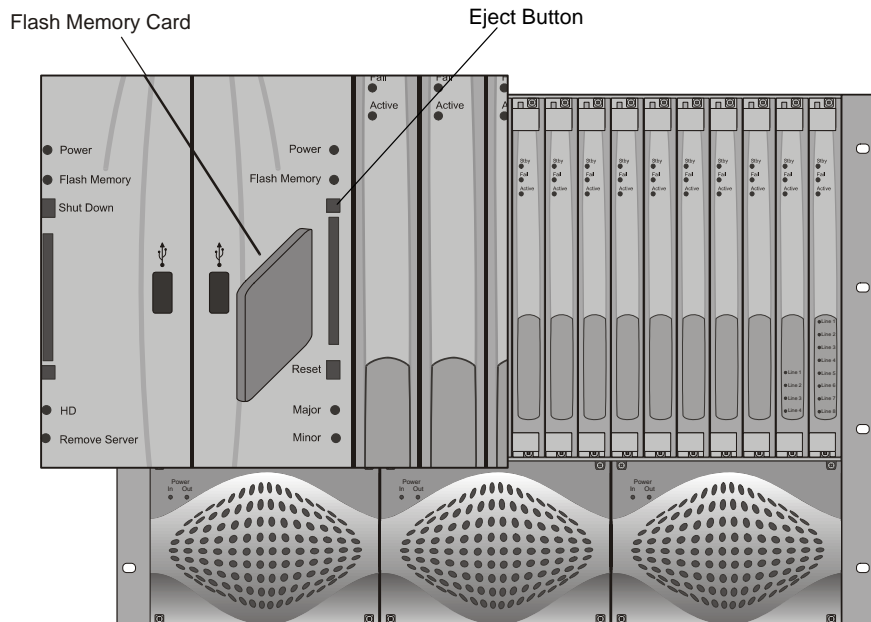
- If the V.35 or RS-530 cable is used, attach the special adapter (provided with the kit) to the 37-pin prior to connecting the serial cable from the DCE.
- The serial (MPI) network properties must be defined in the Network Services, for details, see MGC+ Administrator's Guide, Chapter 3.

## Compact Flash Memory Use on the MGC+

The Main Control Unit's Compact Flash port is used to perform the following tasks:

- pSOS Rescue Disk
  - Contact you next level of support
- Swapping the Operating System (OS)
  - Contact your next level of support
- First Entry MGC+ Control Unit (CU) IP Configuration using:
  - pSOS OS
  - XPEK OS

The Compact Flash slot is located on the Main Control Module, below the *Flash Memory* LED. When the *Flash Memory* is active, the LED flashes.



Do not press the *Reset* button or turn the system OFF while the *Flash Memory* LED is flashing.

### Inserting the Compact Flash Disk into the MGC+ Compact Flash slot:

1. Insert the Flash Memory disk into the slot.
2. Press the **Reset** button on the MGC+.
 

The following menu appears on your monitor's screen.



For first entry LAN/IP configuration please refer to the section "First Entry MGC+ Control Unit (CU) IP Configuration" on page 2-43.

```

#####
#
# Please choose the appropriate action by selecting option: 1, 2 or 3
# If no selection is made, the first option will execute within 15 seconds
#
#####
1. Change the MGC+ IP settings <check your lan.cfg for correct configuration>
2. Perform rescue operation <for pSOS only, contact support prior to selection>
3. Change MGC+ OS <You are required to contact support prior to selection>
Please make you selection now...

```

3. Select an option as explained in the following sections.

## Rescue Disk (pSOS)

With the pSOS operating system the user is able to perform a Rescue Operation using the compact flash disk inserted in the Compact Flash port. The advantage of the Rescue Operation is that it enables a short recovery time on the system should any failure occur.

To select this option press **2**, *Perform rescue operation*. For more information contact your next level of support.

## Swapping the Operating System (OS)

The Compact Flash enables you to switch between two types of operating systems:

- pSOS
- XPEK

To select this option press **3**, *Change MGC+ OS*. For more information contact your next level of support.

# MGC+ Software Installation and Configuration

The MGC+50/MGC+100 requires basic configuration before you can start running conferences. You are required to configure the RediConvene IAM and MGC+ Control Unit (CU) blades on the MGC+.

## Initial RediConvene IAM Configuration

For entering system configuration settings and deploying the RediConvene IAM to your Network refer to the Polycom RediConvene IAM Getting Started Guide, Chapters 1 and 2.

## First Entry MGC+ Control Unit (CU) IP Configuration

This section describes the first entry IP Configuration for pSOS and XPEK Operating Systems.

The MCU is delivered with a Compact Flash disk that includes a LAN.cfg file with a default IP address. First, you have to change the default address to the IP address appropriate for the LAN. This procedure is described below.

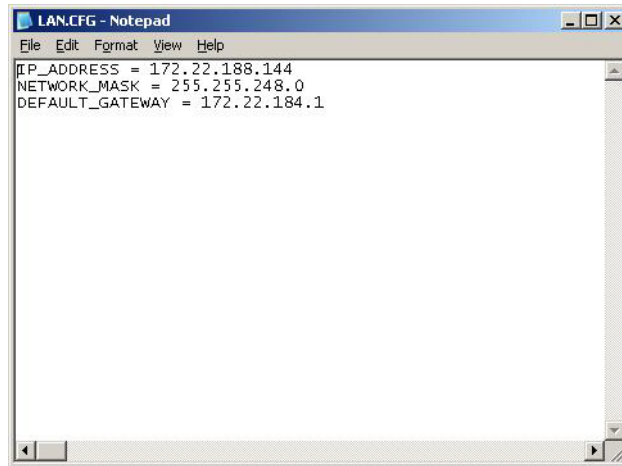
Methods that can be used for a first Entry IP Configuration are:

- LAN.CFG File
- Cross over cable
- Keyboard and mouse

## Method 1 - Using a Compact Flash with the Updated LAN.CFG File:

You are required to use a USB to Compact Flash adaptor (supplied with the MGC+ accessory kit) connected to any PC. For first entry configuration you are required first to alter the LAN.cfg file and change the default IP address on the Compact Flash disk.

1. Insert the Compact Flash disk into the Compact Flash adaptor and open using a text editor application, the LAN.cfg file stored on the Compact flash card. The LAN.cfg file contains three parameters that require editing:



2. Edit the file with the following text:



Make sure no blank spaces are inserted at the end of each line.

```
IP_ADDRESS = aaa.bbb.ccc.ddd  
NETWORK_MASK = aaa.bbb.ccc.ddd  
DEFAULT_GATEWAY = aaa.bbb.ccc.ddd,
```

where aaa, bbb, ccc, and ddd are numbers between 0 to 255, as follows:

Table 2-3: IP Configuration Options

Option	Description
<i>IP Address</i>	Enter the IP address allocated to the MCU by the network administrator.
<i>Subnet Mask</i>	Enter the subnet mask IP Address as defined by the network administrator.
<i>Default Gateway</i>	Enter the default gateway IP Address as defined by the network administrator.

3. Save the changes in the **LAN.CFG** file.



4. Use the Microsoft *Unplug or Eject Hardware* procedure prior to removing the Flash disk.
5. Remove the Compact Flash Memory disk from the reader.
6. Insert the Compact Flash disk into the MGC+ Control Module Compact Flash slot.
7. Press **Reset** on the MGC+.  
The Options menu appears.
8. Press “**1, Change the MGC+ IP Setting**”



If no monitor is connected, the automatic default time-out selects option 1.

The *Flash Memory* LED must be active and flash.

9. Press **Eject**, after the message “1 File(s) copied” is displayed onscreen and the *Flash Memory* LED no longer flashes.

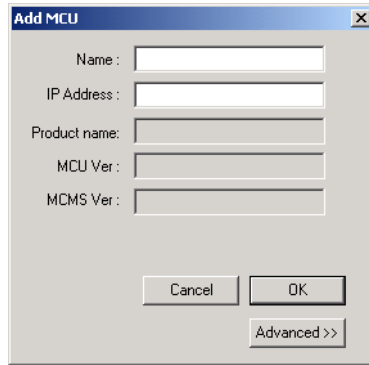


Do not press the *Reset* button while the *Flash Memory* LED is flashing.

10. Remove the Compact Flash card from the MGC+ Control Module compact flash slot and press **Reset** on the MGC+.
11. Connect the MCU to your site’s network.
12. In the MGC+ Manager, define a new MCU using the IP address you have entered in the LAN.CFG file:
  - a. In the *Browser* pane, right-click the *MCUs Network* icon, and then click **New MCU**.



The *Add MCU* dialog box opens.



- b. In the *Name* box, enter the name of the MCU. Specify a name that clearly identifies the MCU.
- c. In the *IP Address* box enter the default IP Address of the MCU as entered in the LAN.CFG file.
- d. Click **OK**.  
The new MCU is added to the MCUs list.

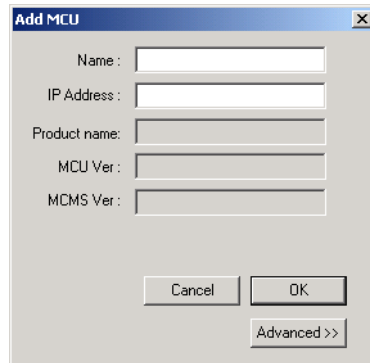
## Method 2 - Using a Cross-over Cable and a Laptop to Connect to the MCU

1. Connect a cross-over LAN or Hub cable between the laptop and the rear panel of the MCU.
2. On the laptop, click **Control Panel ->Network Connection->Local Area Connection**.
3. In the *Local Area Connection - General* dialog box, click the **Properties** button.
4. In the *Local Area Connection Properties* dialog box, click **Use the following IP address**, and define the address of the laptop as part of the same network segment as the MCU. For example, 129.254.4.7.
5. Click **OK**.
6. Install the MGC+ Manager application and start this application.
7. Define a new MCU using the default IP address:

- a. In the *Browser* pane, right-click the *MCUs Network* icon, and then click **New MCU**.

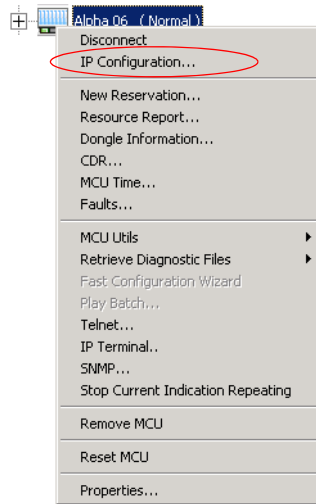


The *Add MCU* dialog box opens.

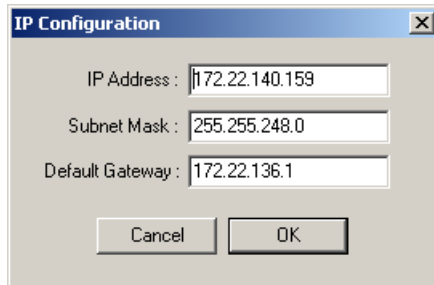
A screenshot of the 'Add MCU' dialog box. The dialog has a title bar with 'Add MCU' and a close button. It contains five input fields: 'Name:', 'IP Address:', 'Product name:', 'MCU Ver:', and 'MCMS Ver:'. At the bottom, there are three buttons: 'Cancel', 'OK', and 'Advanced >>'. The 'Advanced >>' button is disabled.

- b. In the *Name* box, enter the name of the MCU. Specify a name that clearly identifies the MCU.
  - c. In the *IP Address* box, enter the default IP Address of the MCU (129.254.4.8).
  - d. Click **OK**.  
The new MCU is added to the MCUs list.
8. In the MCUs list, double-click the MCU icon to connect to it.
  9. Modify the IP address of the MCU unit as allocated by the network administrator (this is the IP address with which the MCU is identified on the LAN).

- a. Right-click the *MCU* icon, and then click **IP Configuration**.



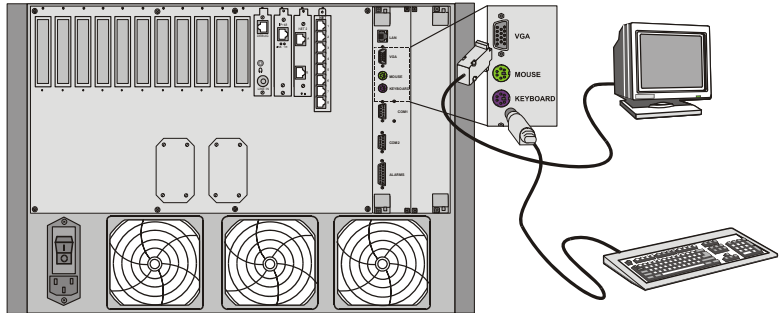
The *IP Configuration* dialog box opens.



- b. If required modify the parameters and click **OK**.
10. Press **Reset** on the MGC+.
  11. Disconnect the MCU from the local network that you have created.
  12. Connect the MCU to your site's network.

## Method 3 - Defining the IP address using a Keyboard and Mouse:

1. Access the Main Control Module rear I/O panel.



2. Press the **Reset** button on the MCU.  
The command line is displayed.
3. Type `C:\>dir mcu\cfg` and press **Enter**.
4. Type `C:\>\mcu\cfg>edit lan.cfg` and press **Enter**.  
The *Edit* screen opens displaying the IP configuration parameters.
5. Enter the new *IP Address*.  
If required, modify the *Subnet Mask* and the *Default Gateway* values.
6. Save the new IP configuration and exit the DOS editor.
7. Press the **Reset** button the MGC+.

## Formatting and Creating a New Compact Flash Boot File

The user can create a new boot file on a Compact Flash Disk, by running the file named *system.exe* located in the *Compact Flash System* folder of your MGC+ Software & Documentation CD.

### To create a new Compact Flash boot file:

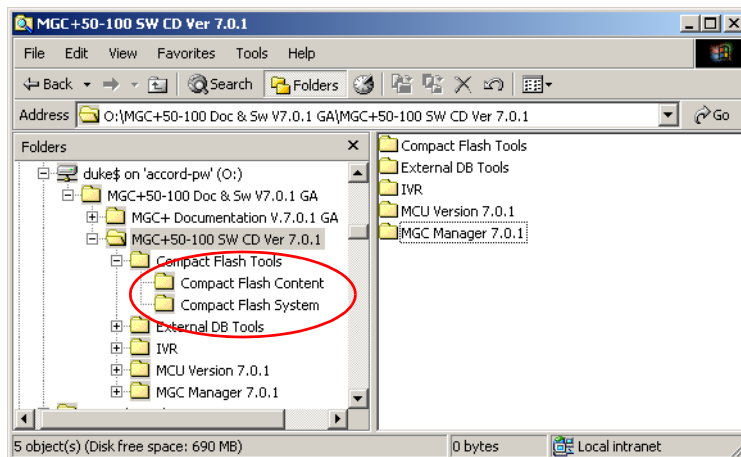
You are required to use a USB to Compact Flash adaptor (supplied with the MGC+ accessory kit) connected to any PC.

1. Insert the Compact Flash disk into the Compact Flash adaptor.

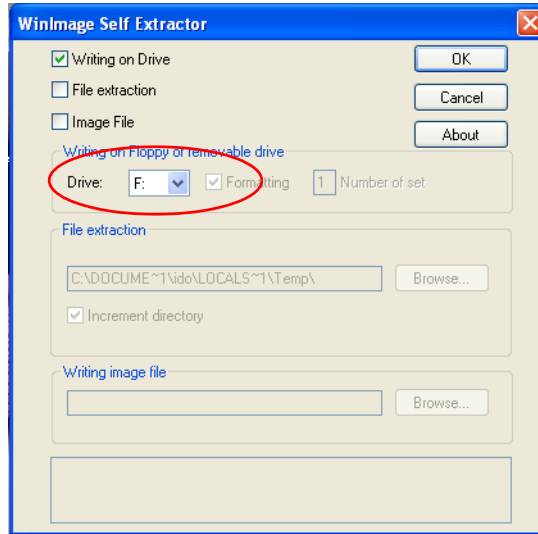


Do not use the Windows *Format* option to create a Compact Flash Boot disk.

2. In the MGC+ Software & Documentation CD, browse to the *Compact Flash System* folder.



3. Double-click the **System.exe** file and the *WinImage Self Extractor* dialog box appears.



4. Select from the *Disk* drop-down box a letter for your Compact Flash disk, and click **OK**.  
After a few seconds a new Compact Flash Boot disk is created.
5. **Copy** the the files located in the *Compact Flash Content* CD Folder onto the Compact Flash Disk.

## Clocking

To be able to work with the network connected to the MCU you need to synchronize the system clock with the network clock. This is done in two steps:

- Selecting the network type according to which the system clock will synchronize. Only one system type may be selected for clocking. The clock source is then defined in the “system cfg”.
- Selecting the spans of the selected network that will act as Master and Backup clocks. The Master and the Backup clock must be set on spans of the same network type.

For more details regarding the clocking setup, see the MGC+ Administrator’s Guide, “Clocking” in Chapter 5.

You have completed the hardware installation. The next step in the installation procedure is to install the MGC+ Manager software. For more information, refer to the MGC+ Administrator’s Guide, Chapter 2.



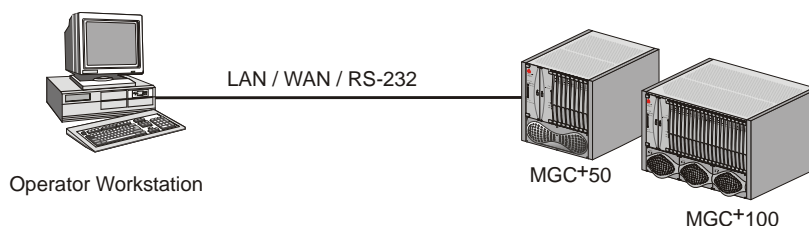
---

## System Architecture

The MGC+ unit is designed to provide maximum reliability, minimum interruptions, and effortless maintenance. Removable active components are accessed via the front panel to provide quick and easy serviceability. Redundant power supplies are easily accessed via the front panel, ensuring a fail safe operation (the MGC+50 power supply is not redundant, therefore not hot-swappable). Network connections on the back of the unit enable easy module removal and prevent accidental disconnection.

All Functional Modules are front-removable and hot-swappable, allowing servicing functions to be performed while the system is in operation.

The operator accesses the MGC+ unit from an operator work station which is connected to the MGC+ unit via an Ethernet interface or an RS-232 interface, as shown in Figure 3-1, “MGC+ interfaces”.



*Figure 3-1: MGC+ interfaces*

Figure 3-2, “MGC+100 Components” on page 3-2 and Figure 3-3, “MGC+50 components” on page 3-3 show the internal layout of the MGC+100 and the MGC+50, respectively. All of the MGC+ modules and cards connect to the backplane.

The MGC+ Unit is made up of:

- Main Control Module, located in Slot A
- Functional Modules, located to the right of the Main Control Module when the unit is viewed from the front
- Power Supply Module, located underneath the Main Control Module and Functional Modules
- Input/Output cards, located behind the backplane opposite the Functional Modules

The various modules communicate with each other via the Backplane. The Control Bus and Information Highway are implemented on the Backplane.

Figure 3-2 describes the functional block diagram of the MGC+100 components.

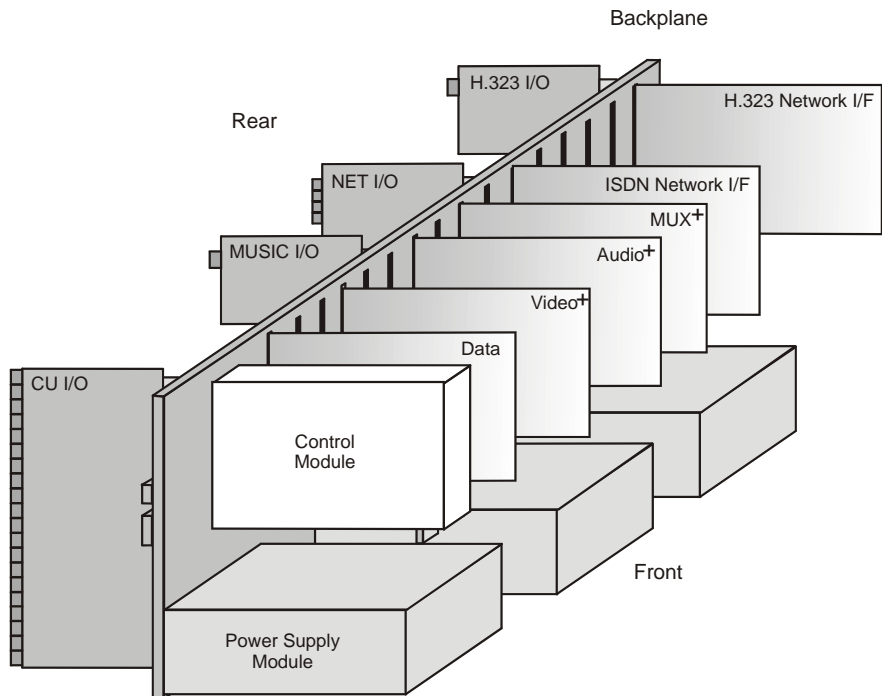


Figure 3-2: MGC+100 Components

Figure 3-3 describes the functional block diagram of the complete MGC+50.

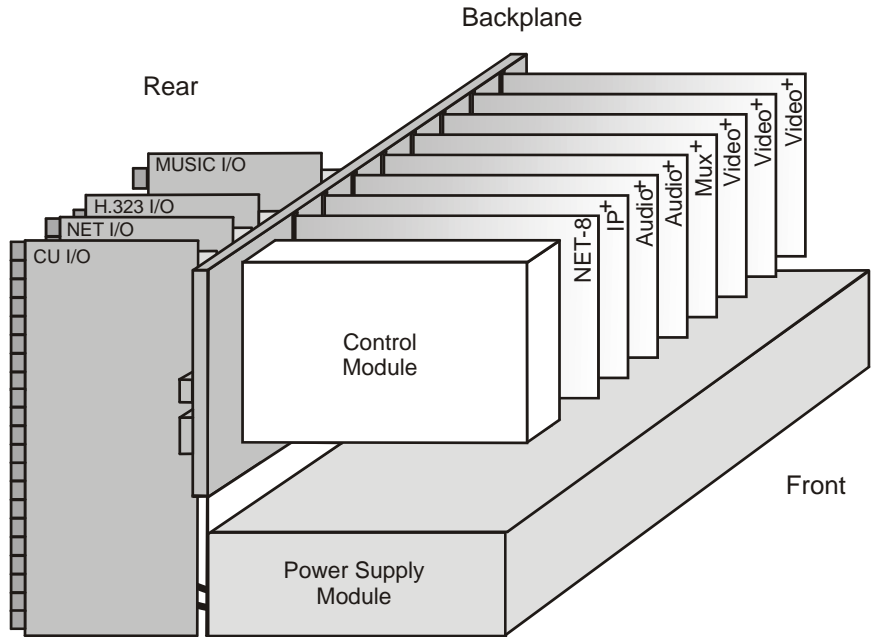


Figure 3-3: MGC+50 components

Figure 3-4 shows the physical layout of the MGC+100 and how it interfaces with the outside world.

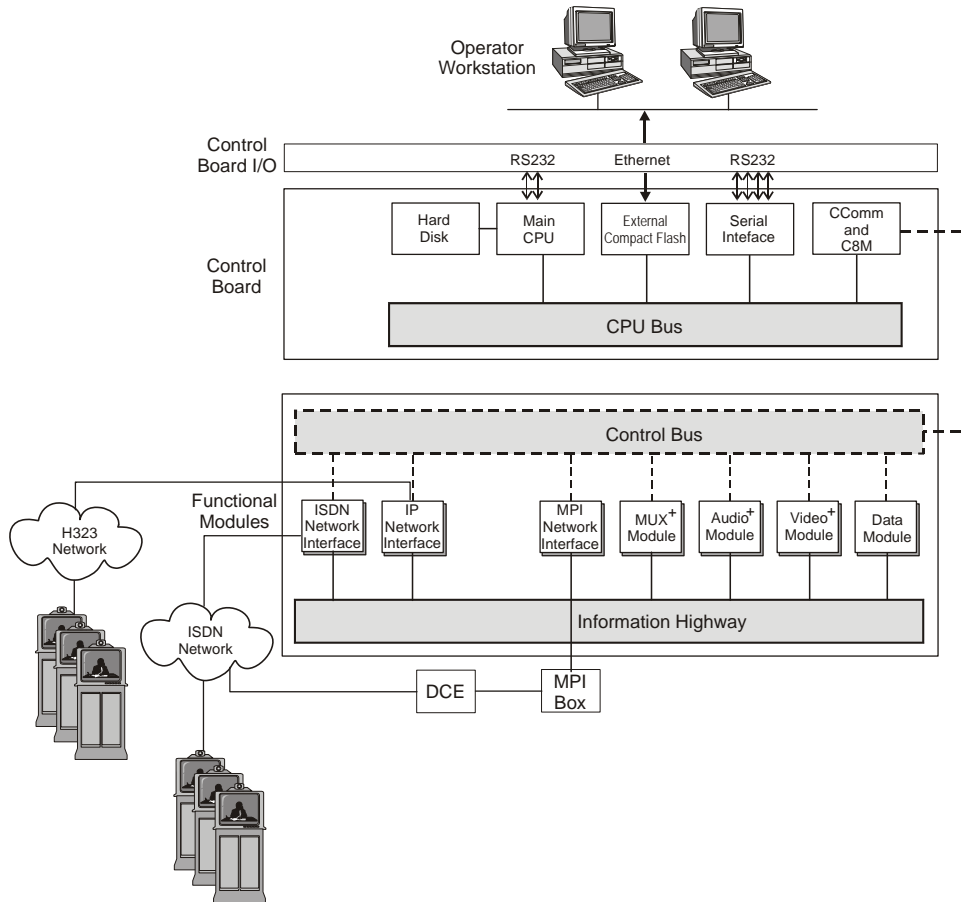


Figure 3-4: MGC+ unit functional block diagram

## Information Flow

Figure 3-5 shows the flow of information within the system.



The MUX+ Module is not used with the H.323/SIP modules.

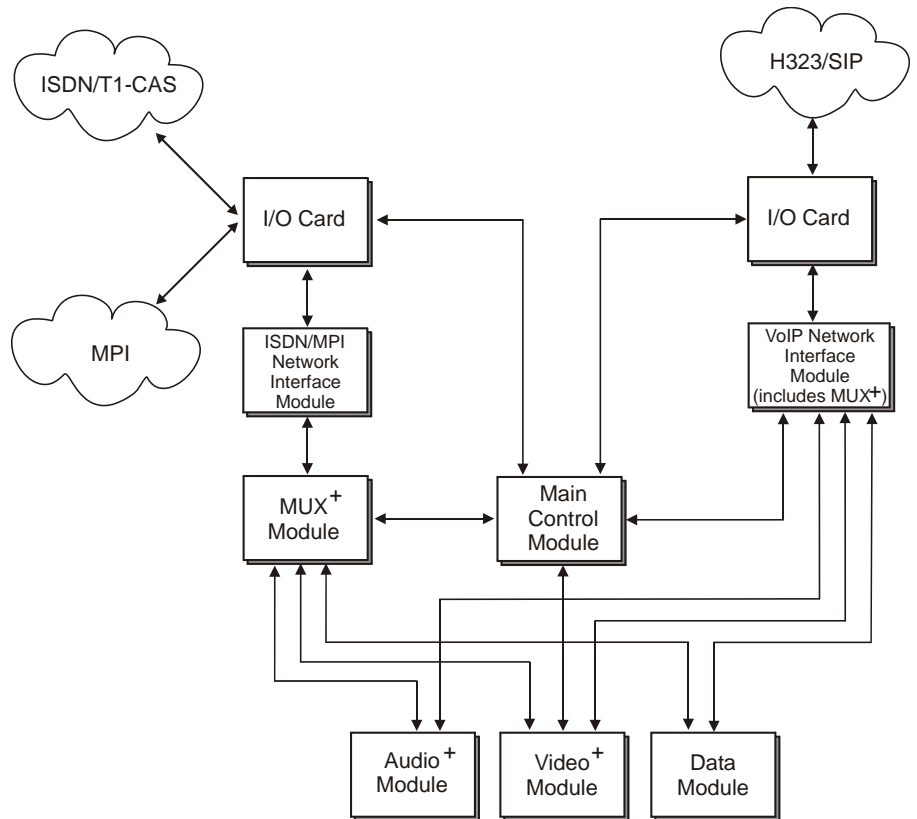


Figure 3-5: Signal flow process

Information enters the MGC+ units from the telecommunications network via a PBX or CSU, and into the Network Interface Module. The information is then transferred to the MUX+ Module via the Internet.

The MUX+ Module transfers the control information to the Main Control Module via the Control Bus. The control information is then processed by the Main Control Module and a control response forwarded via the Control Bus to the appropriate MUX+ Ports.

The MUX+ module divides the incoming information into audio, video and data components, and then forwards the information to the appropriate functional module. The information arriving at the MUX+ ports is multiplexed into Nx56/64 Kbps channels. These channels can be hyperchannels or aggregated channels, depending on the capabilities of the network and the receiving terminals.

The MUX+ Module transfers audio information to the Audio+ Module via the Information Highway. The audio information is then processed by the Audio+ Module and forwarded via the Information Highway to the appropriate MUX+ ports.

The MUX+ Module transfers video information to the Video+ Module via the Information Highway. There are two modes of video operation during a conference:

- Video Switching, where the speaker is the only person shown on the screen. The MUX+ module broadcasts the video of the current speaker to all sites involved in the conference.
- Continuous Presence, where several participants are shown on the screen. The video information is processed by the Video+ Module and forwarded via the Information Highway to the appropriate MUX+ Ports.

The MUX+ Module transfers T.120 data (which follows the ITU-T T.120 standard for data transfer and application sharing in a multipoint conference) to the Data Module via the Information Highway. The data information is processed by the Data Module and forwarded to the appropriate MUX+ Ports.

After the audio, video, and data information has been processed, the processed information flows back to the MUX+ module for multiplexing, after which it is sent to the network via the Network Interface module and the Input/Output card. This information is then transferred to the Network Interface module via the Information Highway. The information is then ready for transmission.

## MGC+ Manager Interface

As shown in Figure 3-4, “MGC+ unit functional block diagram” on page 3-4, the Main Control Unit communicates with the MGC+ Manager through the LAN interface or the RS-232 interface.

## Power Supply Flow

For the MGC+100, the AC power inlet is connected by a switch through a 15 Amp. circuit breaker and then filtered to the power plan and then to the AC power supply module. 12V is also delivered to the fans.

For the MGC+50, the AC power inlet is connected through a 15 Amp. circuit breaker and then filtered to the AC power supply module. 12V is also delivered to the fans.





---

# Hardware Description

This chapter describes the various components that make up the MGC+ unit. The following components are described:

- MGC+ ReadiManager IAM
- Control Unit
- Backplane
- Power Supply Modules
- Fans
- Alarms port
- Functional Modules
  - Net-2/4/8 (ISDN/T1-CAS)
  - IP+12, IP+24, IP+48 (H.323/SIP)
  - MPI-4, MPI-8
  - MUX+10, MUX+20, MUX+40
  - Audio+12/24, Audio+24/48, Audio+48/96
  - Video+8
  - Data (T-120)
- Input/Output (I/O) cards

# MGC+100 Components Location

Figure 4-1 shows the front panel of the MGC+100. The front panel provides access to the Main Control Module, the Functional Modules, and the Power Supply Modules. Status LEDs on the Main Control Module, Functional Modules, and Power Supply Modules indicate the status of the system.

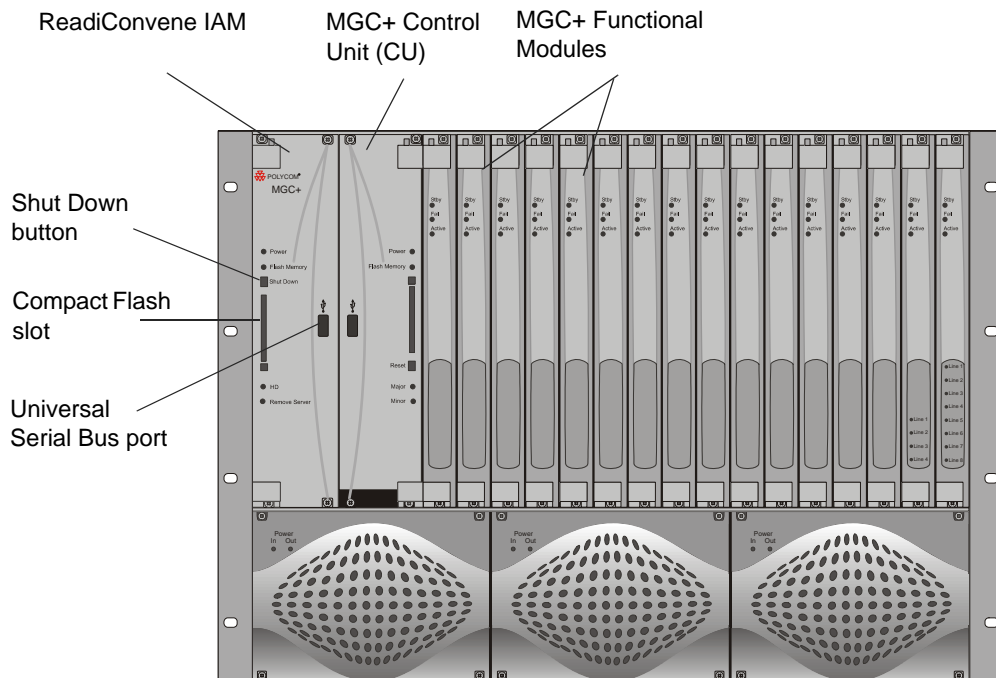


Figure 4-1: MGC+100 front panel

Figure 4-2 shows the rear panel of the MGC+100. The rear panel provides access to the network I/O card connectors. I/O cards are inserted via the rear panel. In addition, the rear panel houses the main power switch, AC inlet, fans, the circuit breaker, additional communications ports and alarm ports. The alarms port provides dry contacts for major and minor alarms.

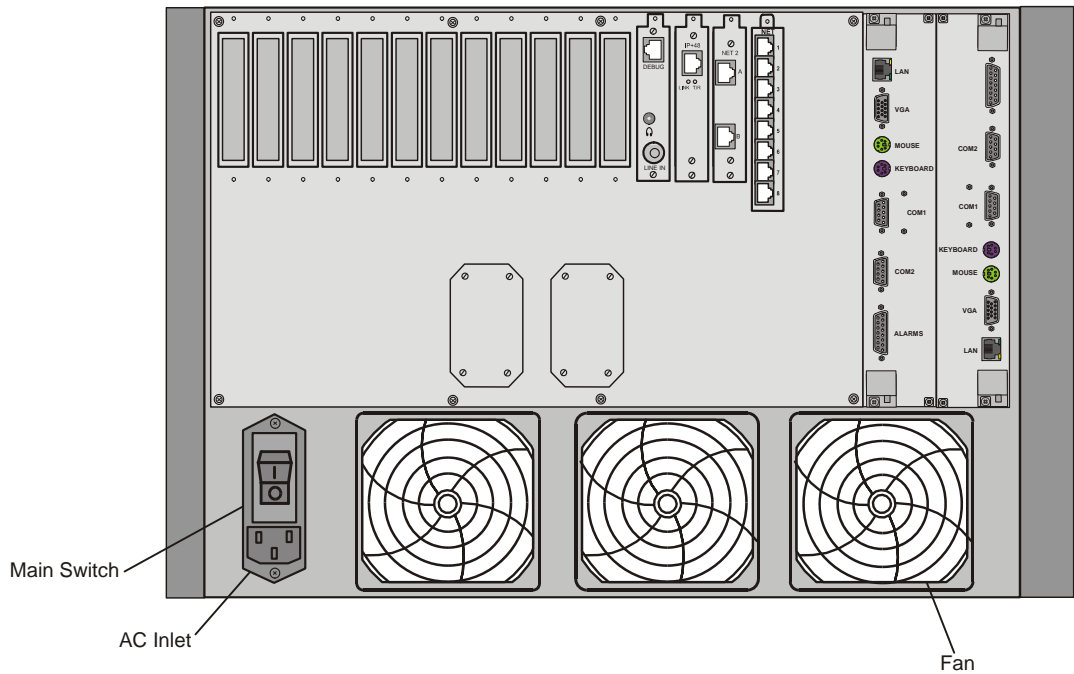


Figure 4-2: MGC+100 rear panel with external connectors

Figure 4-3 shows the top view of the inside of the MGC+100. The Main Control Module, Functional Modules, and I/O cards are all connected to the Backplane. The Power Supply Modules, located underneath the Main Control Module and the Functional Modules, are connected to the Powerplane.

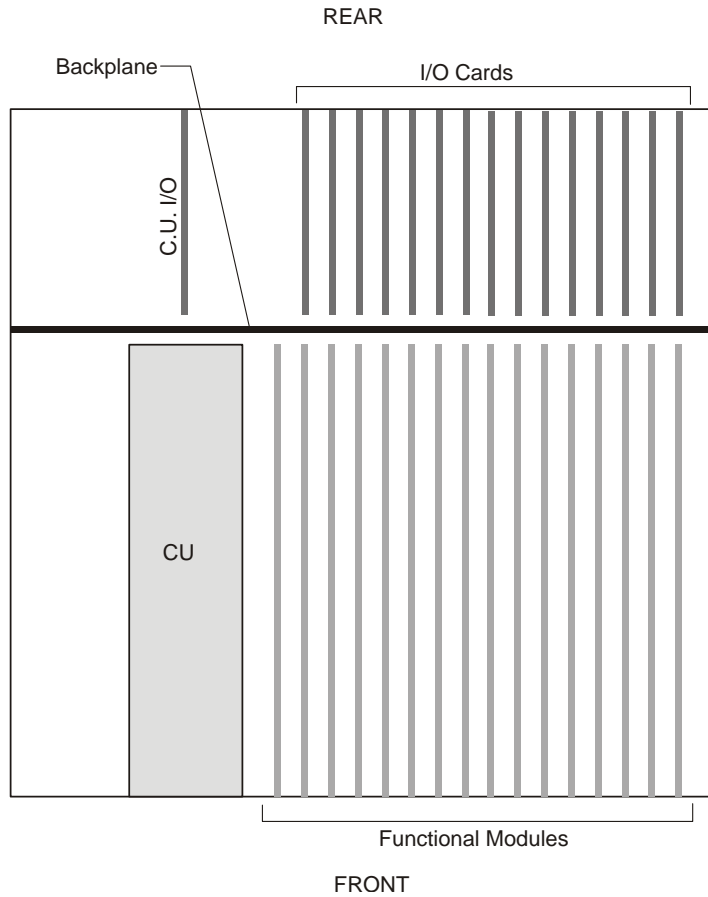


Figure 4-3: MGC+100 top (internal) view

## MGC+50 Components Location

Figure 4-4 shows the front panel of the MGC+50. The front panel provides access to the Main Control Module, the Functional Modules, and the Power Supply Module. Status LEDs on the Main Control Module, Functional Modules, and Power Supply Module indicate the status of the system.

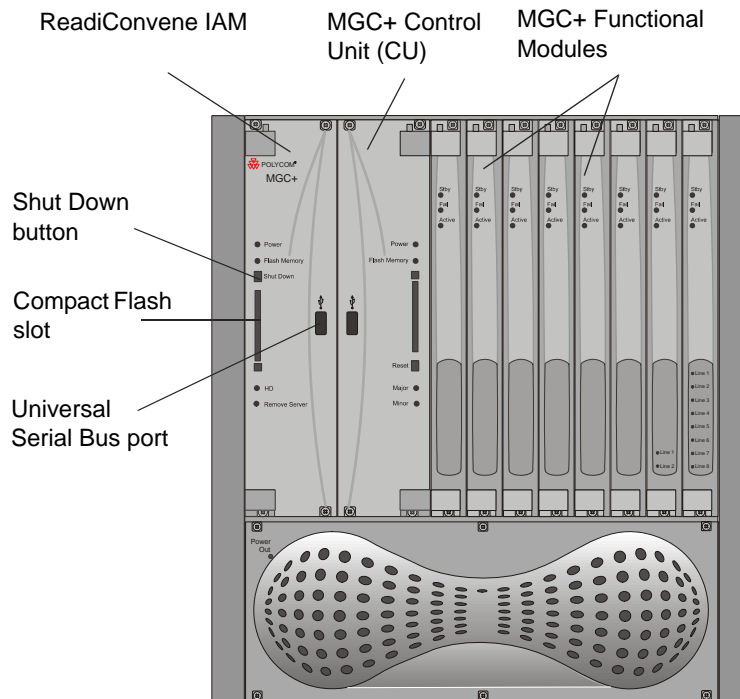


Figure 4-4: MGC+50 front panel

Figure 4-6 shows the top view of the inside of the MGC+50. The Main Control Module, Functional Modules, and I/O cards are all connected to the Backplane. The Power Supply Module is located underneath the Main

Control Module and the Functional Modules, and is connected by wire leading to the backplane.

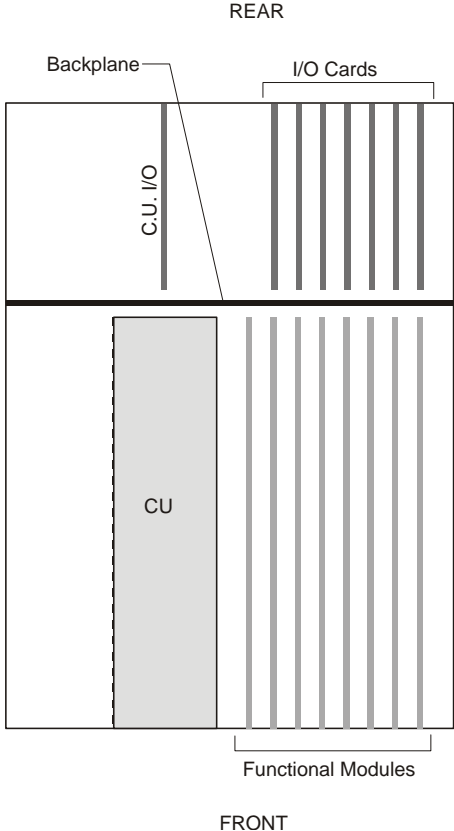


Figure 4-5: MGC+50 top (inside) view

## ReadiManager IAM

The ReadiManager IAM refers to the Polycom® MGC+ that houses the Integrated Application Module (IAM). The ReadiManager provides the hardware platform to run the ReadiManager™ software application.

The ReadiManager has an Intel-based Pentium 4 processor, Compact Flash, Hard Disk Drive and 1 GB of Memory. The Control Unit is located in slot A of the MGC+, and is connected to the MCU's backplane and rear I/O panel.

The front LED's indicate the status if the module is in operation and functioning properly.

*Table 4-1: ReadiManager IAM Specifications*

Physical	Specifications
CPU	Intel Pentium IV 2.8 Ghz.
Flash Compact	1 GB.
RAM Memory	1 GB. non ECC DDR SDRAM 266 Mhz or higher.

## Control Unit

The Main Control Unit performs the functions of conference setup, conference termination, and resource allocation in both the MGC+100 and the MGC+50. The Main Control Module has an Intel-based Pentium processor, a hard disk drive and 256 MB of memory. The Control Unit is located in slot A of the MGC+, and is connected to the MCU's backplane and Control Module rear I/O panel.

The front LED's indicate the status if the module is in operation and functioning properly.

Figure 4-7 shows a block diagram of the Main Control Module.

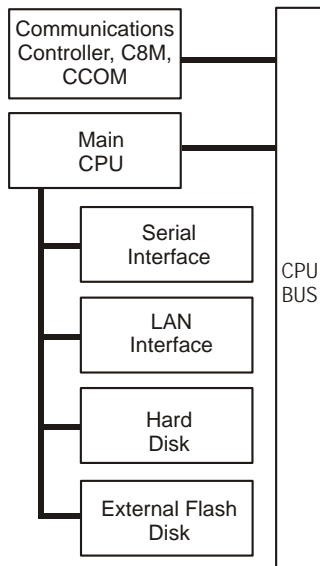


Figure 4-6: Block diagram of MCM



The MGC+ unit can contain different types of functional network cards. The Main Control Module operating system includes drivers for all of the cards. The Main Control Module's operating system automatically detects the card type. If the card is correctly identified, the system starts up correctly. If the system fails to detect any card type, it will start up according to the card type definition in the system.cfg file.



The Main Control Module includes several connectors. These are connected to ports on the chassis. Two types of connectors on the rear panel provide connections from the MGC+ to various external systems. These systems include reservation systems, local or remote operator consoles, management systems and billing systems. One connector is a standard Ethernet LAN interface, which support operator workstations operating on LANs via TCP/IP. The other connector is an RS-232 interface on COM2, which is used for local diagnostics and production purposes.

An RS-232 interface connector on COM2 the rear panel is provided for connecting to operator workstations locally or remotely (via a modem). The connector is used for local diagnostics and production purposes.

The Main Control Module Control Bus connects to the Functional Modules. The CCOM and C8M provides the interface between the Main Control Module and the Backplane. This module also generates the MCU clock. The operating system running on the Main Control Module uses the Processor's internal clock interrupts to set up its real-time clock. Sometimes, the operating system's clock may skip one or several interrupts resulting in a time difference between the two clocks. In such a case, the operating system compares the two clocks. When a discrepancy between the two clocks is detected, the operating system updates its clock according to the Main Control processor's clock. This feature ensures that long-term reservations start on time.



This feature does not correct any time difference between the MGC+ Manager's clock (which is derived from the Windows operating system run on the operator workstation) and the MCU internal clock.

## Backplane

The Backplane is based on the “universal slot” concept, where any functional card can be inserted in any functional slot. Therefore, different configurations are formed based on the users’ port capacity and functionality requirements. The Backplane supports hot swapping of Function Modules and all I/O cards.

In the MGC+100, the front of the Backplane contains 16 slots for Functional Modules and an additional slot (Slot 1) for the Main Control Module. The back of the Backplane contains 16 slots for I/O cards (15 slots for I/O and 1 slot for the Main Control Module). The Network Interface Modules connected via the Backplane to I/O cards, which connects the system to the network. The Power Supply Module provides power to the Backplane via a power bus.

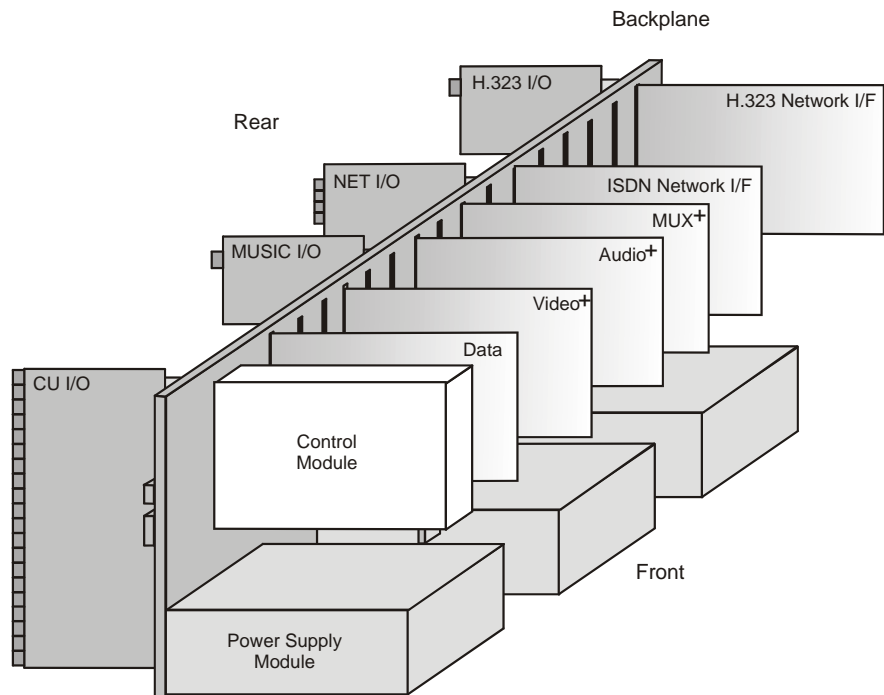


Figure 4-7: MGC+100 Backplane

In the MGC+50, the front of the Backplane contains eight slots for Functional Modules and additional slot (Slot A) for the Main Control Module. The back of the Backplane also contains 7 slots for I/O cards and 1 slot for the Main Control Module. The Network Interface Module is connected via the Backplane to I/O cards, which connect the system to the network. The Power Supply Module provides power to the Backplane via a power bus.

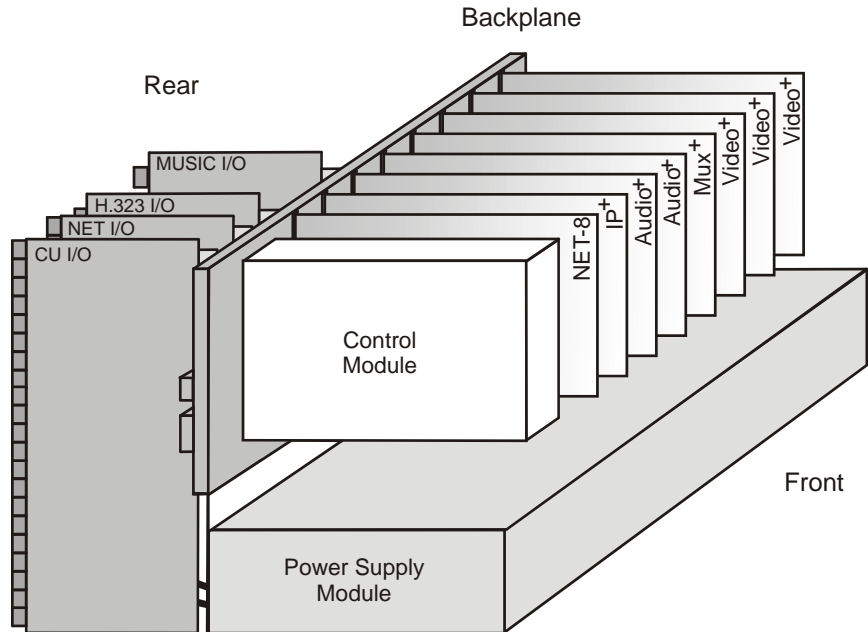


Figure 4-8: MGC+50 Backplane

## Control Bus

The MGC+100 and the MGC+50 use the same Control Bus. The Control Bus connects the Main Control Module to the Functional Modules. The Control Bus is an HDLC bus. A double bus is implemented for redundancy.

## Information Highway

The Information Highway is a high capacity TDM-type bus. It is used by both the MGC+100 and the MGC+50. The Information Highway transfers information from the Network Interface Modules to the MUX+ Modules and from the MUX+ Modules to the Audio+, Video+ and Data Modules except during IP calls. In IP calls (H.323 and SIP) the information is transferred directly to the IP+ network module and from there to the Audio+, Video+ and Data modules.

## Powerplane

The MGC+100, as opposed to the MGC+50, uses a Powerplane. Up to three Power Supply Modules can be plugged into the Powerplane. The Powerplane and Power Supply Modules are designed to accommodate hot swapping of power supplies.



In the MGC+50, there is one power supply, which is connected to the backplane and fans via wire leads.

## Power Supply Module

Both MGC+ units (MGC+100 and MGC+50) operate at 100-240 volts AC 50/60 Hz.

### Power Module in the MGC+100

Three redundant power supplies provide backup for the system to ensure multipoint service is not interrupted as a result of any single power supply failure. The Power Supply Modules are hot swappable and connect to the Powerplane, which is part of the Backplane.

The power supply automatically senses the AC input voltage.

Two Power Supply Modules are required to power a full system.

Three Power Supply Modules are installed on the MGC+, with one power supply providing redundancy. Should one power supply fail the other two power modules are sufficient to power the MCU.

The capacity of each power supply module is shown in Table 4-1.

*Table 4-2: MGC+100 Power supply modules capacity*

Voltage (V)	Maximum current (Amp.)
5	90
12	6.5
-12	1

## Power Module in the MGC+50

In the MGC+50, the Power Supply Module is not hot swappable. The power supply automatically senses the AC input voltage.

The capacities of the power supply module are shown in Table 4-3, “MGC+50 Power supply module capacity”.

*Table 4-3: MGC+50 Power supply module capacity*

Voltage (V)	Maximum current (Amp.)
5	120
12	13
-12	.5

## Power Supply Cord

The MGC+100 and the MGC+50 use only power supply cords supplied by Polycom Inc. or equivalent UL approved cable, rated at a current of up to 15 A, depending on country standards, for its AC power supply. The following specifications are for both the MGC+100 and MGC+50.

## Circuit Breaker (AC Power)

Currently, MGC+100 and MGC+50 Control Units come equipped with a circuit breaker.

*Table 4-4: MGC+ Circuit Breaker Specifications*

MGC+ 50	MGC+100
AC Voltage - 10Amp at 100 VAC, 5 Amp at 240 VAC protected by a 15 Amp circuit breaker.	AC Voltage - 15 Amp at 100 VAC and 7.5 Amp at 240 VAC protected by a 15 Amp circuit breaker.

The specifications of the Power Supply modules of the MGC+100 is shown in “MGC+100 Power supply modules capacity” on page 4-13. The specifications of the Power Supply module of the MGC+50 is shown in “MGC+50 Power supply module capacity” on page 4-14.

## Fans

Three fans are mounted at the bottom of the rear panel on the MGC+100. Each fan has an alarm, which is monitored by that Main Control Module. Two fans are mounted at the bottom of the rear panel on the MGC+50. On both MCU’s the system can generate an alert upon failure. For configuration requirements and information, contact your next level of support.

## Alarms Port

The main control module I/O module includes an Alarm port. The Alarm port on the rear panel of the MGC+-100 can be connected with the MCU’s fans and power supplies.

The Alarm port on the rear panel of the MGC+50 can only be connected to the MCU’s fans.

For more information see, “Front Panel LEDs” on page 5-4.

The Alarms port has the following specifications:

- Voltage rating: 60 V DC maximum
- Current rating: 0.2 A maximum

On the MGC+50, Alarms ports are in use for the two fans.

The pin assignment of the Alarm port are specified in the section “Alarms Port Pin Assignment” on page A-2.

## Functional Modules

The Functional Modules (cards) perform the various audio, video, and data processing functions for the MGC+ unit. Both the MGC+100 and the MGC+50 use the same functional modules.

The MGC+100 unit houses up to sixteen Functional Modules, which can occupy slots 1 through 16.

The MGC+50 unit houses up to eight Functional Modules, which can occupy slots 1 through 8.

The LED's on the front of each Functional Module indicate the status of operation and whether it is functioning properly. Functional Modules are installed via the front panel of the MGC+ unit. A connector at the rear of each functional module connects the module to the backplane. Any module can be inserted into any slot. All Functional Modules are front-removable and hot swappable.

Table 4-5 lists the available Functional Modules.

*Table 4-5: MGC+ Functional Modules Description*

Functional Module	Function	Port capacity
<b>Net-2</b> ISDN/T1-CAS Network Interface	Interfaces between the MGC+ unit and the ISDN network or T1-CAS lines.	46 channels/60 ISDN channels or 48 T1-CAS channels
<b>Net-4</b> ISDN/T1-CAS Network Interface	Interfaces between the MGC+ unit and the ISDN network or T1-CAS lines.	92 channels/120 ISDN channels or 96 T1-CAS channels
<b>Net-8</b> ISDN/T1-CAS Network Interface	Interfaces between the MGC+ unit and the ISDN network or T1-CAS lines.	184 channels/240 ISDN channels or 192 T1-CAS channels
<b>IP+12/24</b>	Perform signaling and capabilities exchange for conferencing. Encrypted conferences with IP participants, SIP sessions and mixed component conferences that include SIP participants require IP+ cards	32 channels at 128Kbps



Table 4-5: MGC+ Functional Modules Description

Functional Module	Function	Port capacity
IP+24/48	Perform signaling and capabilities exchange for conferencing. Encrypted conferences with IP participants, SIP sessions and mixed component conferences that include SIP participants require IP+ cards	48 channels at 128Kbps
IP+48/96	Perform signaling and capabilities exchange for conferencing. Encrypted conferences with IP participants, SIP sessions and mixed component conferences that include SIP participants require IP+ cards	96 channels at 128Kbps
MPI-4	Uses dialing protocols to communicate to endpoints using "Data Terminal Equipment" (DTE), or Data Communications Equipment (DCE).	120 channels/92 channels
MPI-8	Uses dialing protocols to communicate to endpoints using "Data Terminal Equipment" (DTE), or Data Communications Equipment (DCE).	240 channels/184 channels
Audio+	Performs audio compression, decompression	<ul style="list-style-type: none"> <li>• Audio+12/24 - 12/24* ports</li> <li>• Audio+24/48 - 24/48* ports</li> <li>• Audio+48/96 - 48/96* ports</li> </ul> * video/audio conferences

Table 4-5: MGC+ Functional Modules Description

Functional Module	Function	Port capacity
Video+8	Performs video processing and Transcoding.	Up to 8 participants
MUX+10	Multiplexes and demultiplexes audio, data, video, and control information; performs channel aggregation, enables Encryption.	18 channels at 128Kbps
MUX+20	Multiplexes and demultiplexes audio, data, video, and control information; performs channel aggregation, enables Encryption.	128 36 channels at 128Kbps
MUX+40	Multiplexes and demultiplexes audio, data, video, and control information; performs channel aggregation, enables Encryption.	72 channels at 128Kbps
Data Module (T-120)	Performs data routing and conference control.	<ul style="list-style-type: none"> <li>• T.120-12 standard card - 12 ports</li> <li>• T.120-24 card - 24 ports</li> </ul>

The different types of Functional Modules are used to produce a variety of configurations. In the MGC+50 up to eight individual Functional Modules can be used to build the desired configuration. In the MGC+100, 16 modules can be used.

Figure 4-10 shows the general design of the Functional Modules. The components that are common to all Functional Modules are shown in detail in the figure and are described in Table 4-6 on page 4-19.

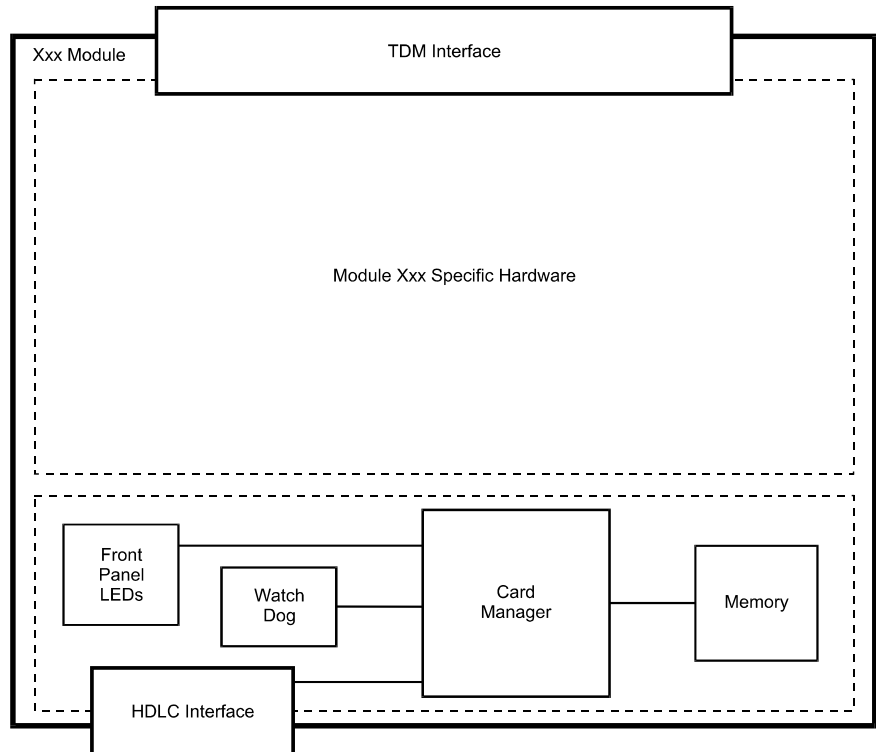


Figure 4-9: General module architecture

Table 4-6: Common functional module components

Component	Description
Card Manager	The Card Manager processor.
HDLC Interface	Provides the interface for the Control bus.
Watch Dog	Represents the Watch Dog, power control, and reset switch.
Memory	Represents the RAM for processor general use and the flash for the card CPU's software and module specific information such as serial number.

The Functional Modules are described in detail in the following segments.

## Net-2/Net-4/Net-8 or T1-CAS Network Interface Module

The Net-2/Net-4/Net-8 Network Interface module provides the interface between the MGC+ unit and the ISDN network or T1-CAS lines.

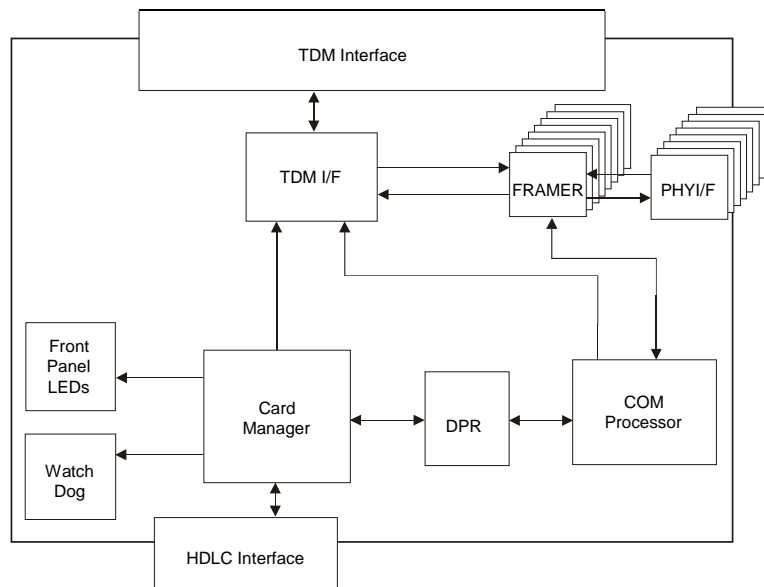


Figure 4-10: Net-2/Net-4/Net-8 ISDN/T1-CAS Network Interface Module



The same type of card can be used to connect ISDN lines or T1-CAS lines. However, you cannot connect ISDN lines and T1-CAS lines to the same network card.

The Net-2/Net-4/Net-8 card connects to the I/O-2, I/O-4, and I/O-8 cards respectively. The I/O-8 card contains connections of up to eight PRI spans, of either an E1 or T1 line and it can work with both types simultaneously. When the Net-2/Net-4/Net-8 card is used for T1-CAS lines, only T1 spans are connected to the I/O card.

Different types of ISDN and T1-CAS Network Interface Modules can be installed. For more details, see “MGC+ Functional Modules Description” on page 4-16.

The module's front panel includes two, four or eight tri-color LEDs (depending on the card's configuration). Depending on the states of the LEDs inputs, the LED can be off, green, red or yellow. The red and yellow states indicate alarms.

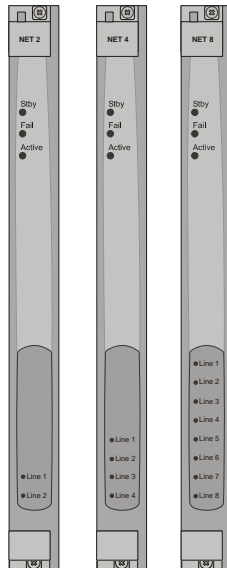


Figure 4-11: 2/4/8 tri-color LED NET cards front panels

### The Net-2/Net-4/Net-8 ISDN/T1-CAS Network Interface Data Stream

Figure 4-12 shows a block diagram of the Net-2/Net-4/Net-8 network interface of the MGC+ unit.

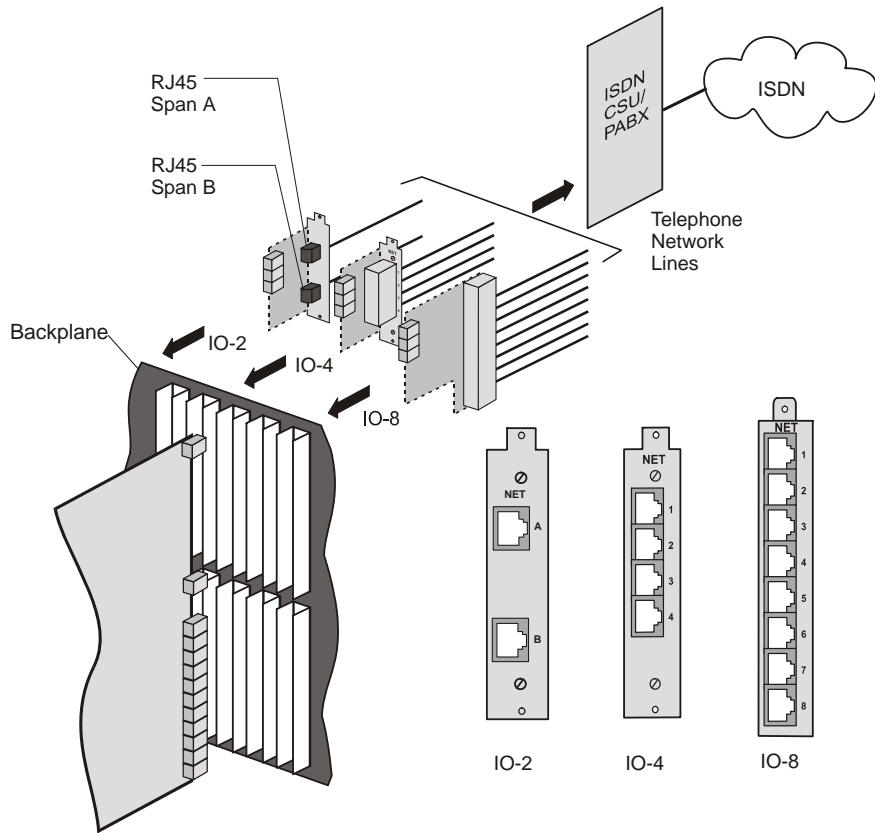


Figure 4-12: Net-2/Net-4/Net-8 ISDN/T1-CAS ISDN Network Interface Block Diagram

The ISDN Network Interface Module is connected to the telephone network via the IO card (IO-2, IO-4 or IO-8), which is connected to the PABX and CSU. The customer is responsible for supplying the PABX and CSU.

The ISDN data stream flows from the ISDN telecommunication network through the PABX > CSU > MGC+ RJ-45 input connector > IO card (IO-2, IO-4 or IO-8) > Backplane connectors > Network Interface Module to the Backplane information bus.

## IP+ Network Interface Module

The IP+ Network Interface Modules support participant connections using H.323 communication standards. The IP+ Network Interface Module also supports SIP participants.

H.323 is a standard for audio, video and data communications across IP based (LAN) networks, including the Internet. H.323 allows endpoints to use multimedia applications without changing the network infrastructure. H.323 also allows device independent communications between different endpoints. Conference participants therefore do not have to worry about devices and compatibility.

Session Initiation Protocol (SIP) is an application layer protocol designed to work over IP networks. SIP can establish, modify, and terminate multimedia sessions (conferences).

The IP+ modules provide bandwidth management, that ensures that corporate networks will not be clogged and critical data cannot be disrupted. Network managers can limit the number of simultaneous IP connections within their network or the amount of bandwidth available to IP applications.

The IP+ Network Interface modules combine two very different functions in one board. This interface module is primarily an IP+ network card, using H.323 standards for video conferencing, with an added MUX+ capability that uses H.320 standards. The IP+ module design includes an Ethernet network interface and a heavy processing core to handle data.

An MCU with IP only configuration requires the IP+ Network interface module and *Audio+/Video+/Data* cards for conferencing. In that case, the IP+ module performs the MUX+ functionality.

A more powerful MCU configuration combines the two network interface cards to form a gateway. In this configuration, an IP endpoint can participate in the same conference as an H.320 endpoint.

The IP+ modules contains an embedded software module that interfaces between the MCU and the external Gatekeeper.

The IP+ cards are available in IP+12, IP+24 and IP+48 port sub-assemblies. The following table lists the type of IP+ card, its version number, its compatibility with SIP, VoIP and Encrypted conferences and its capacity.

IP+ cards are available with version 4.23 and higher.

Table 4-7: IP+ Card Types

IP+ Card Name	HW Version	SIP Support	Number of Units	VOIP Call Capacity	Encryption
IP+12	≥ 4.41	+	1	32	✓
IP+24	≥ 4.41	+	2	64	✓
IP+48	≥ 4.41	+	3	96	✓

Conferences that include SIP defined participants require IP+ cards from version 4.41.

**Module Port Capacity**

The number of participants in a conference is limited by the Line Rates and conference type. Table 4-8 describes the port capacities of the cards using different line rates.

Table 4-8: IP Participant Types and Line Rate Capacities

Line Rate Kbps	Number of Participants					
	IP+12		IP+24		IP+48	
	Non-encrypted	Encrypted	Non-encrypted	Encrypted	Non-encrypted	Encrypted
128	32	16	64	32	96	48
256	32	12	64	24	96	36
384	16	8	32	16	48	24
512	12	6	24	12	36	18
768	8	4	16	8	24	12
T1/E1	4	2	8	4	12	6



### IP+ Network Interface Module Architecture

The IP+ Network Interface Modules have the same general card structure as other MGC+ modules: Card-Manager, TDM interface, and the functional units.

Figure 4-13 shows the architecture for the IP+ Network Interface Modules.

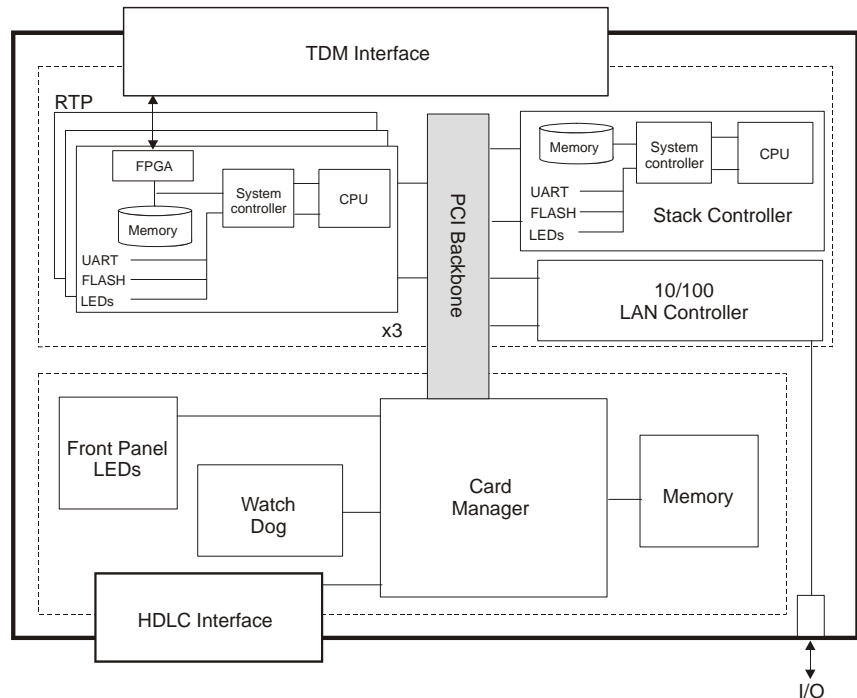


Figure 4-13: IP and IP+ Network Interface Module architecture

The IP+ module is accompanied with an IP LAN-I/O card. The LAN Ethernet 10/100BaseT is connected via the I/O card at the back of the MCU.

## The MPI-4/8 Network Interface Module

MPI is an acronym for the Multi Protocol Interface card. The MPI-8 is a serial communications interface card that uses certain protocols to communicate to endpoints, “Data Terminal Equipment” (DTE), or “Data Communications Equipment” (DCE). The protocols that it uses are RS-449, RS-530, V.35, and RS-366, which is a dialing protocol.

The MPI-4/8 Network Interface Module is connected to the DCE (supplied by the customer) via the MPI box. The front panel of the MPI-4/8 network interface contains two 160-pin connectors.

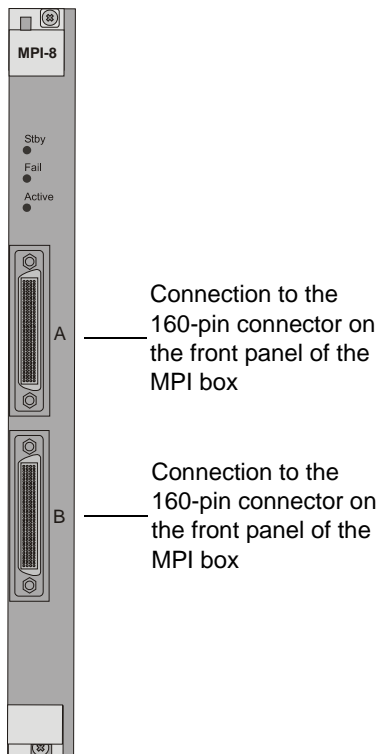


Figure 4-14: MPI-4/8 Network Interface Module front panel

Each 160-pin connector can be connected to one 160-pin connector located on the front panel of the MPI box.

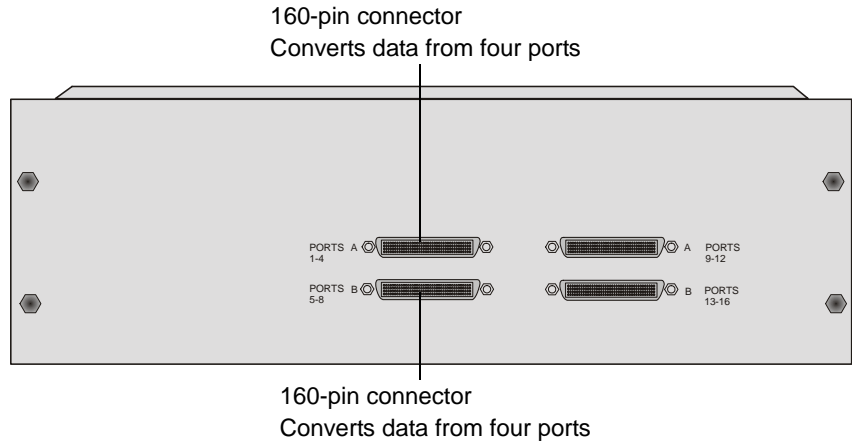


Figure 4-15: MPI box front panel

Each of the 160-pin connectors on the MPI box interfaces to four serial ports found on the back of the MPI box. Therefore, each MPI-4/8 Network Interface module can be connected to up to eight ports. Each port has two connectors: 37-pin connector and the 25-pin connector. The 25-pin connector is used to dial to an endpoint over an ISDN switch. (In leased line connection this port is not used.) The 37-pin connector connects to the serial cable coming from the DCE.

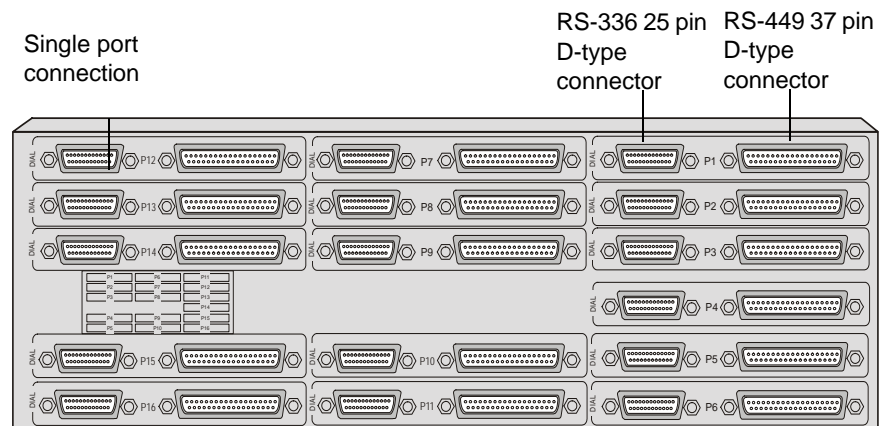


Figure 4-16: MPI box rear panel

## MPI-4/8 Network Interface Data Stream

### When the MCU is set as a DTE

The ISDN data stream flows from the ISDN telecommunication network through the DCE to the serial port (37-pin connector) on the MPI box. The data is then directed from the 37-PIN connector to the 160-PIN connector, which gathers data from four different ports, and channels the data stream to the 160-pin connector located on the MPI-4/8 front panel. The data is then converted from serial format to TDM format and flown to the Backplane information bus.



The master and the Backup clock must be set on spans of the same network type.

Since this is full duplex communication, the data is also flowing in the opposite direction. Figure 4-17 shows the data flow on an ISDN data stream.

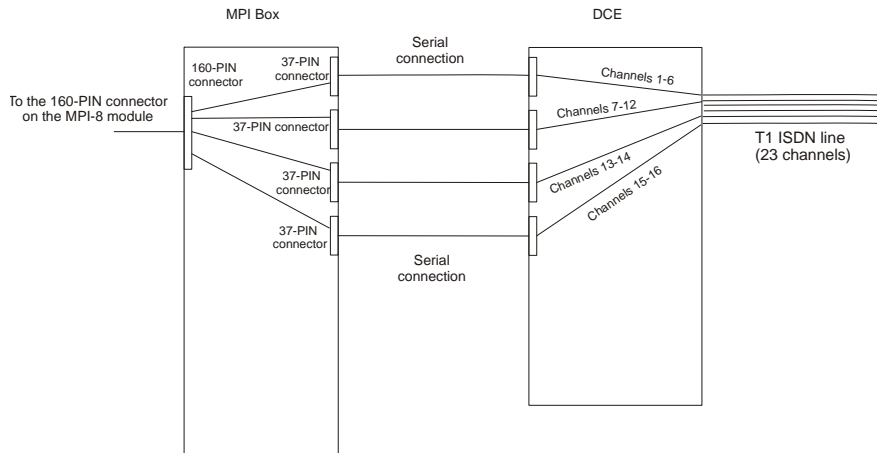


Figure 4-17: MPI Data Flow when MCU is DTE

### When the MCU is set as a DCE

The serial data stream flows from the endpoint (DTE) through the serial connector entering the MPI box by way of the 37-pin connector. The data is then directed from the 37-pin connector to the 160-pin connector connected to the MCU (DCE). In the MCU the data stream is converted to a TDM format, and then sent to the backplane information bus. Since this is a full duplex communication, the data is also bi-directional.



The network clock is enabled only when the span coming from the DCE to the MCU is active (i.e. handles a call). Therefore, the spans defined as Primary and Backup clock must be connected first when starting a conference and disconnected last when terminating the conference.

Figure 4-18, “MPI Data Flow when MCU is DCE” shows the data flow on a serial connection - the endpoints are connected directly to the MPI Box.

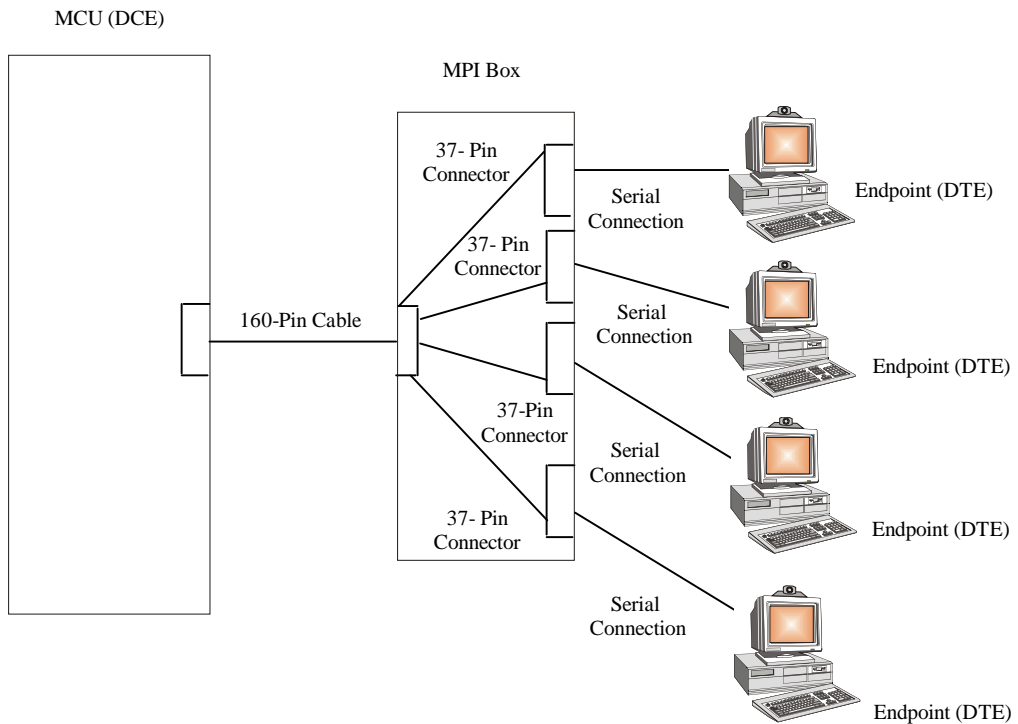


Figure 4-18: MPI Data Flow when MCU is DCE

### MPI Network Interface Module Architecture

Figure 4-19, “MPI-4/8 Network Interface module architecture” shows the architecture for the MPI-4/8 Network Interface Module.

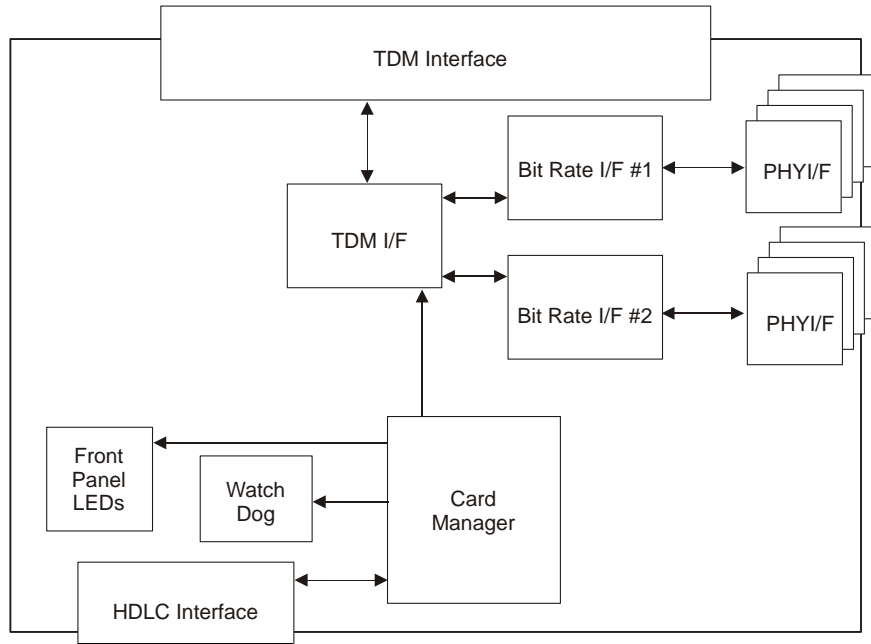


Figure 4-19: MPI-4/8 Network Interface module architecture

## MUX+ Module

The MUX+ card performs multiplexing and de multiplexing of audio, video, data and control information. The MUX+ card has the same general card architecture as other modules. The MUX+ card capabilities include:

- Flexible port allocation
- Supports conference encryption



Encryption requires the MUX+ card.

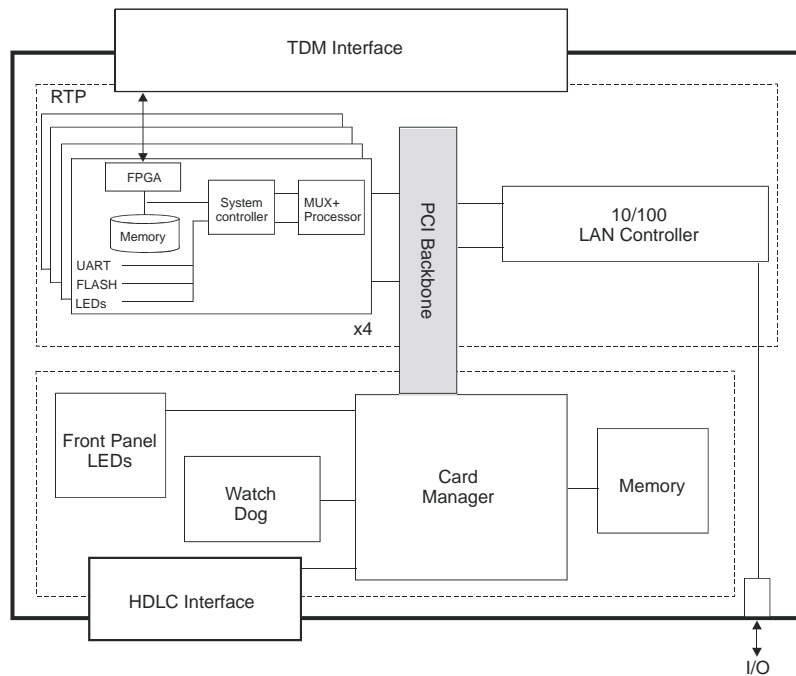


Figure 4-20: MUX+ 40 Module Card Architecture

Three types of MUX+ cards are available:

- MUX+10 with one processor
- MUX+20 with two processors
- MUX+40 with four processors

The MUX+ handles a variety of Line Rates, aggregation calls (1B to 6B) and Bonding calls (128 Kbps to E1).

### MUX+ Card Properties

A flexible port resource allocation mechanism is available with the MUX+ card and allocates ports dynamically thereby decreasing fragmentation. It enables the MCU to allocate and free resources according to the conference requirements without pre-configuring the Line Rate on each card unit.

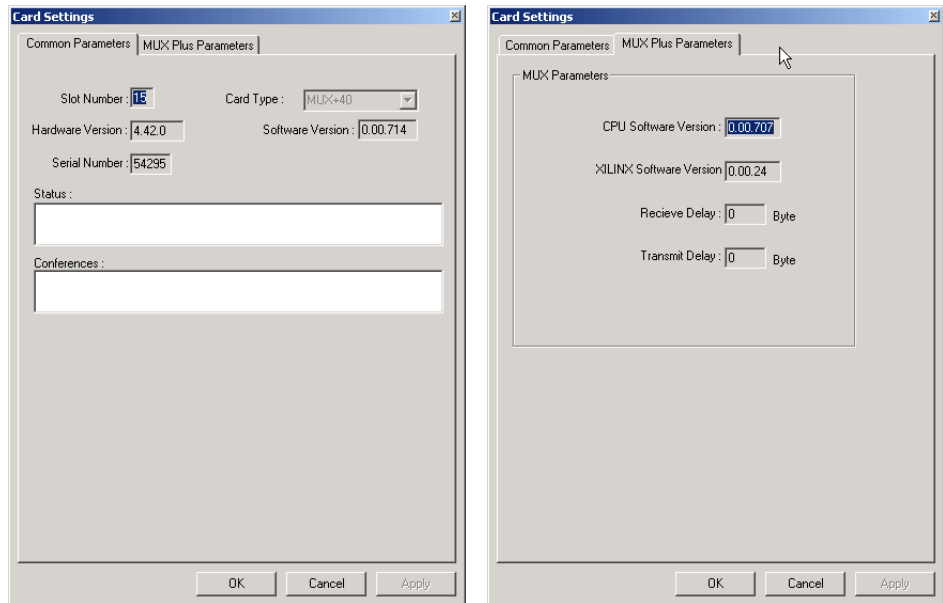


Figure 4-21: MUX+ Card Participant Properties

When version 7.0 software is installed on the MCU, during system re-start the MUX+ is recognized as a new type of card and no configuration is required. The *Card Settings* dialog box definitions - *Common Parameters* and *MUX Plus Parameters* properties are identical to the MUX+ card properties.

For more information see the MGC Administrator's Guide, Chapter 4, *Viewing the MUX+ Module Specific Properties*.



### IVR/Greet & Guide Welcome Slide

Up to four video slides can be stored on the MUX+ card. The Welcome slide is downloaded to all MUX+ cards if more than one card is present on the MGC+ MCU.

### MUX+ Port Capacity

MUX+ resources are allocated at the reservation stage. MUX+ resources are calculated according to the relative weight assigned to the different line rates. Using the dynamic allocation mechanism, the MUX+ eliminates fragmentation and enables better utilization of resources. For example, a participant connecting at a line rate of E1 requires 10 times more resources than a participant connecting at a line rate of 128 Kbps.

Encrypted participants always require MUX+ resources and use more resources than a regular participant as shown in Table 4-9, "MUX+ Cards Port Capacity."

In a system with MUX+ cards, both encrypted and non-encrypted participants resources are allocated and calculated according to the relative weight assigned to the different line rates during a reservation. For example, a MUX+40 card can host 72 non-encrypted or 48 encrypted participants in a conference using a line rate of 128 Kbps.

The following table details the number of ports available with the MUX+ cards.

*Table 4-9: MUX+ Cards Port Capacity*

Card type	Participant Line Rate	Number of non-encrypted ports capacity	Number of encrypted ports capacity
<b>MUX+10</b>			
	128	18	9
	256	16	9
	384	10	5
	512	10	5
	768	6	3
	T1	2	1

Table 4-9: MUX+ Cards Port Capacity (Continued)

Card type	Participant Line Rate	Number of non-encrypted ports capacity	Number of encrypted ports capacity
	E1	2	1
<b>MUX+20</b>			
	128	36	18
	256	32	18
	384	20	10
	512	20	10
	768	12	6
	T1	4	2
	E1	4	2
<b>MUX+40</b>			
	128	72	36
	256	64	36
	384	40	20
	512	40	20
	768	24	12
	T1	8	4
	E1	8	4

### MUX+ Participant Move Options

The administrator has the option to define move behavior of encrypted participants by setting the system.cfg flag:

ALLOW\_ENCRYPT\_IN\_PARTY\_LEVEL =YES/NO.

When set to YES, participants can move:

- From an encrypted conference to a non-encrypted conference or another encrypted conference.

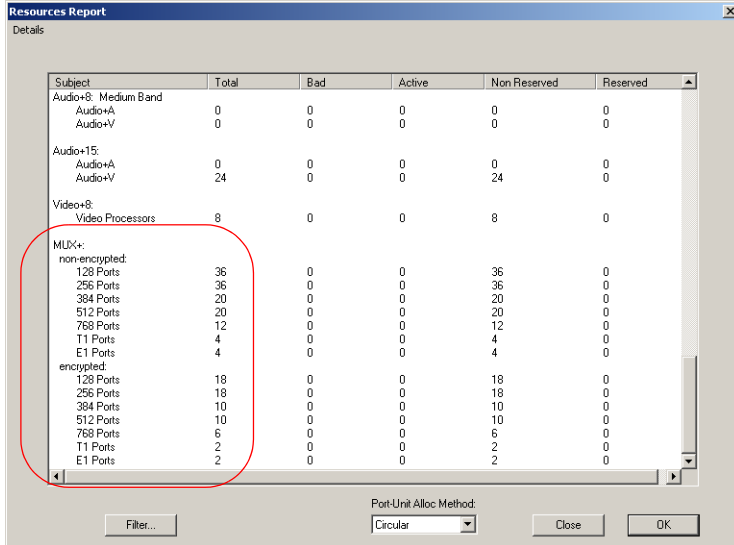
- From a non-encrypted conference to an encrypted conference or another non-encrypted conference.

When the ALLOW\_ENCRYPT\_IN\_PARTY\_LEVEL flag is set to NO, the participant's encryption setting must match the conference encryption setting's to be moved to the other conference. For example, encrypted participants can only move from an encrypted conference to another encrypted enabled conference.

## MUX+ Resource Report

### MGC-50/100 Resource Report

The Resources Report, displays the total number of MUX+ port resources available according to the card type, line rate and encryption.



Subject	Total	Bad	Active	Non Reserved	Reserved
Audio+8: Medium Band					
Audio+A	0	0	0	0	0
Audio+V	0	0	0	0	0
Audio+15:					
Audio+A	0	0	0	0	0
Audio+V	24	0	0	24	0
Video+8:					
Video Processors	8	0	0	8	0
MUX+:					
non-encrypted:					
128 Ports	36	0	0	36	0
256 Ports	36	0	0	36	0
384 Ports	20	0	0	20	0
512 Ports	20	0	0	20	0
768 Ports	12	0	0	12	0
T1 Ports	4	0	0	4	0
E1 Ports	4	0	0	4	0
encrypted:					
128 Ports	18	0	0	18	0
256 Ports	18	0	0	18	0
384 Ports	10	0	0	10	0
512 Ports	10	0	0	10	0
768 Ports	6	0	0	6	0
T1 Ports	2	0	0	2	0
E1 Ports	2	0	0	2	0

In the example shown here, the system lists the total number of ports available with the MUX+20 card for both non-encrypted and encrypted participants, based on their connection line rates. At a line rate of 128 Kbps, up to 36 non-encrypted and 18 encrypted participants can connect to conferences. At a line rate of 384 Kbps, 20 non-encrypted and 10 encrypted participants can connect to conferences running on the MCU.

### **IP/SIP**

In the IP/SIP section of the Resources Report both non-encrypted and encrypted participants are grouped together.

For example, if one encrypted and one non-encrypted participants using a line rate of 128 Kbps attend a conference, the resource report displays the sum of the used resources of both participants together. In this case the non-encrypted participant is allocated 1 port and the encrypted participant 2 ports, totalling 3 ports.

## Audio+ Module

The Audio+ Module performs audio compression, decompression, and bridging. The Audio+ Module also performs transcoding between various audio algorithms.

The Audio+ Module supports the following algorithms:

- ITU-T G.711 48, 56, and 64 Kbps
- ITU-T G.722 48, 56, and 64 Kbps
- ITU-T G.728 16 Kbps
- ITU-T G.722.1
- ITU-T G.723.1
- ITU-T G.729
- Siren7
- Siren14

The Audio+ module enables the usage of the Interactive Voice Response (IVR) software component. Interactive Voice Response (IVR) for video enables video and VOIP conference participants to use the IVR services for interactive routing to conferences and to perform interactive operations from their endpoint using DTMF codes. It stores the voice messages used with IVR Services.

The Audio+ card also enables increased port capacity in Audio Only conferences. Conferences can include participant handled by one card type - either standard audio or the Audio+ family.

## Audio+ Module Architecture

Audio+ represents a new family of audio cards. Audio+ has the same general card architecture as other modules. This has an impact on the number of ports supported by each card.

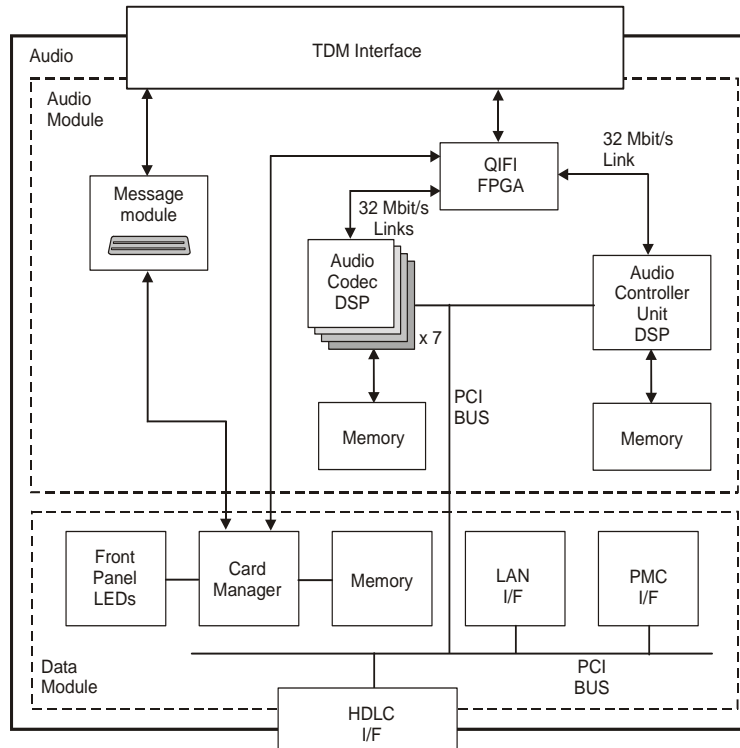


Figure 4-22: Audio+ Module

## Audio+ Port Capacities

The system's working mode affects its system capacity: Medium Band (without Siren14) and Wide Band (with Siren14). The Medium and Wide Band settings are defined in the system.cfg file.

For Medium Band, the flag is set to  
`AUDIO_PLUS_FREQUENCYBAND_MODE=MB.`

For Wide Band, the flag is set to  
`AUDIO_PLUS_FREQUENCYBAND_MODE=WB.`

The following table details the card capacities according to the Audio algorithm used in the conference when the MCU is configured to Medium Band.

Table 4-10: Audio+ card capacity per Audio algorithm - Medium Band setting

Card Type	Audio Algorithm							
	G.711	G.722	G.722.1	G.728	G.723.1	G.729	Siren7	Siren14
Audio+12/24	24	12	12	12	12	12	12	Not supported in Medium Band Mode
Audio+24/48	48	24	24	24	48	48	24	
Audio+48/96	96	48	48	48	96	96	48	

The following table details the card capacities according to the Audio algorithm used in the conference when the MCU is configured to Wide Band.

Table 4-11: Audio+ card capacity per Audio algorithm - Wide Band setting

Card Type	Audio Algorithm							
	G.711	G.722	G.722.1	G.728	G.723.1	G.729	Siren7	Siren14
Audio+12/24	24	12	12	12	12	12	12	12
Audio+24/48	48	24	24	24	48	48	24	24
Audio+48/96	96	48	48	48	96	96	48	48

## Video+ Module

The Video+ module supports up to 8 participants per module. In addition it provides the following features/enhancements:

- Click&View - A graphical console transmitted to endpoints enabling the users to change their personalized video layout or conference.
- Personal Layout - Definition and on-the-fly modification of individualized participant Continuous Presence layouts. For details, see Personal Layout
- Visual Effects - Definition of background colors, frame colors and frame widths for Continuous Presence layouts. For details, see Visual Effects
- Quad Mode Continuous Presence - Additional Continuous Presence layouts suitable for large conferences, i.e. 4x4.
- H.263 video protocol at 30 Frames Per Second
- Improved video Quality
- Improved Continuous Presence image quality at high bit rates (1.52 Mbps)
- No fragmentation - Conferences can be run across Video+ cards
- Large Continuous Presence conferences - Conference size determined only by overall system limitations
- Improved latency



## Video+ Module Architecture

Figure 4-23 shows the Video+ module architecture.

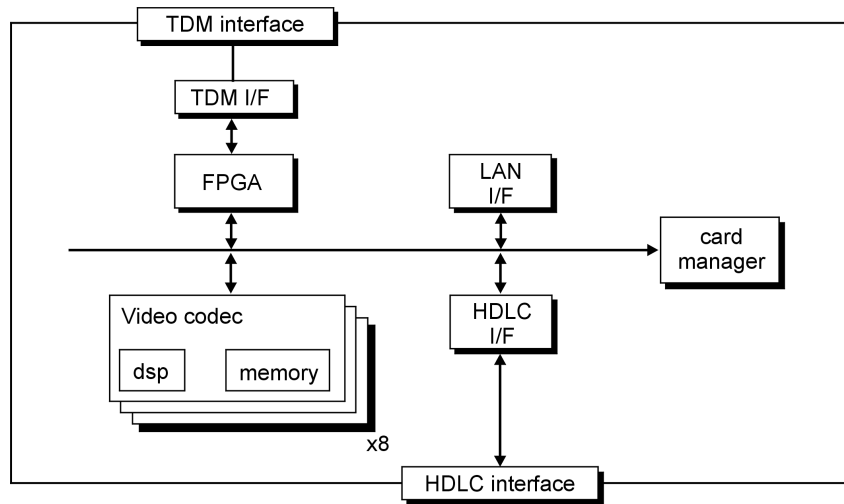


Figure 4-23: Video+ module architecture

## Data Module

The Data Module performs conference data and control routing for up to 12 participants. The system allows for 12 conferences of one participant each, or one conference of 12 participants or any combination in between. In T.120 conferences, the data module does the Transcoding. The module supports various ITU-T T.120 standards for data transfer and application sharing in a multipoint conference.

The Data Module supports the following standards:

- ITU-T T.122/T.125—MCS (Multipoint Communications Service)
- ITU-T T.123—Transport Protocol Stacks
- ITU-T T.124—GCC (Generic Conference Control)

### Data Module Architecture

Figure 4-24 shows the Data Module's architecture.

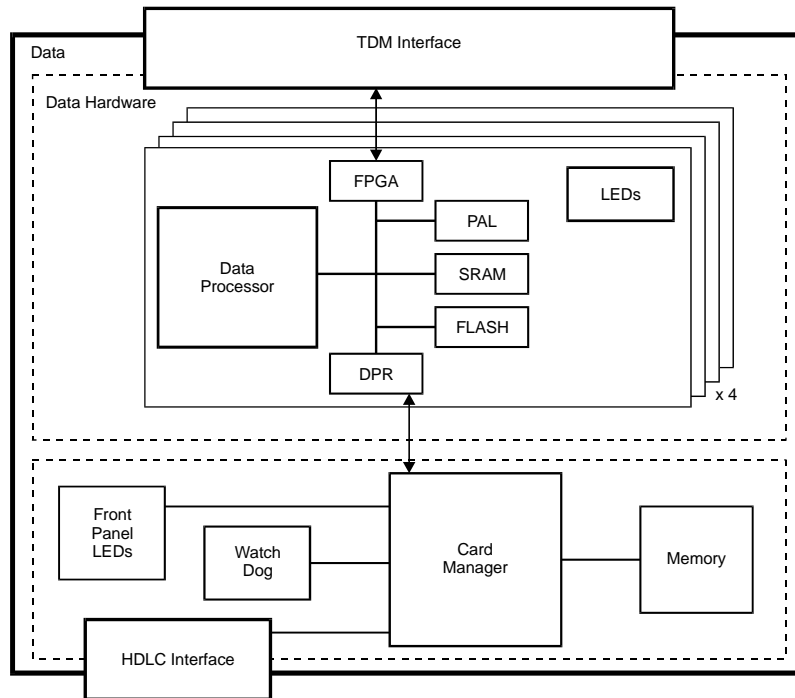


Figure 4-24: Data Module

## Input/Output (I/O) Boards

On the MGC+ there are a number of I/O cards that can be installed on the MGC+:

- I/O board of the ReadManager IAM
- I/O board of the Control Unit (CU)
- Input/Output (I/O) cards connected to Functional Modules
- Music card connected to the Audio+

### Rear I/O Boards

The Control board can house two I/O boards and are connected behind the Backplane of the Control Unit and ReadManager IAM. These I/O cards enable connections to the MGC+ Control Unit and ReadManager IAM.

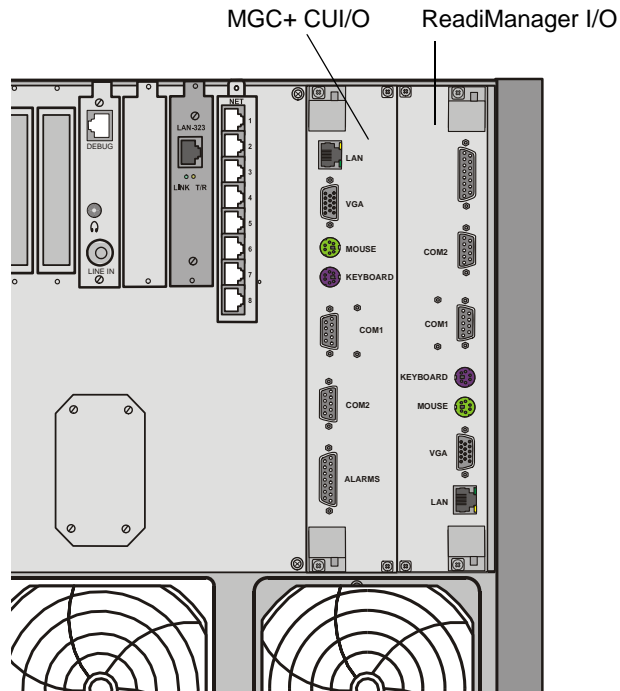


Figure 4-25: MGC+ Control Unit and ReadManager IAM rear I/O panels

The following I/O connections are available:

- LAN - for more information see “Connecting the MGC+100 to the LAN Network” on page 2-19 or “Connecting the MGC+50 to the LAN Network” on page 2-34.
- VGA Monitor - Connection to a VGA standard monitor
- Mouse
- Keyboard
- COM1 - Dongle connection only. For more information see “MGC+100 Dongle” on page 2-17 or “MGC+50 Dongle” on page 2-32.
- COM2 - for more information see “Connecting the MGC+100 to the Operator Workstation (PC) Directly via RS-232 (Optional)” on page 2-19 or “Connecting the MGC+50 to the Operator Workstation (PC) Directly via RS-232 (Optional)” on page 2-34.
- Alarms - for more information, see Chapter 4, “Alarms Port” on page 4-15.

### **Types of I/O cards on functional Modules**

Input/Output (I/O) Cards connect the Functional Modules to external systems and networks. The I/O Cards are housed behind the Backplane, opposite the Functional Modules.

The I/O Cards, which are small and simple, are installed via the rear panel of the MGC+. A connector at the rear of each I/O card connects the card to the Backplane.

The following I/O cards can be installed on functional cards of the MCU:

- The IO-2 card connects two PRI/Leased connections from the MGC+ rear panel to a Net-2 ISDN/T1-CAS Network Interface Module.

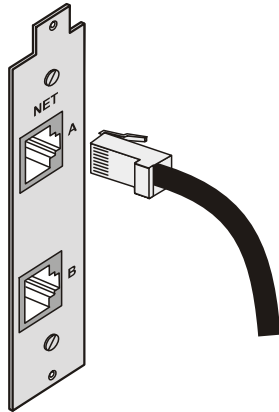


Figure 4-26: ISDN /T1-CAS Network connection for two spans

- The IO-4 card connects four PRI/Leased connections from the MGC+ rear panel to a Net-4 ISDN/T1-CAS Network Interface Module.

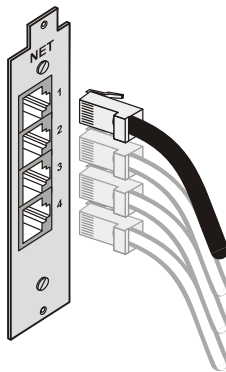


Figure 4-27: ISDN /T1-CAS Network connection for four spans

- The IO-8 card connects eight PRI/Leased connections from the MGC+ rear panel to a Net-8 ISDN/T1-CAS Network Interface Module.

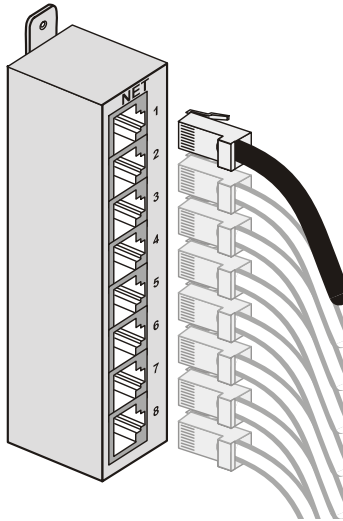


Figure 4-28: ISDN/T1-CAS Network connection for eight spans

- The LAN-IO Card on the rear MGC+ panel connects an IP connection to the H.323 Network Interface Module.

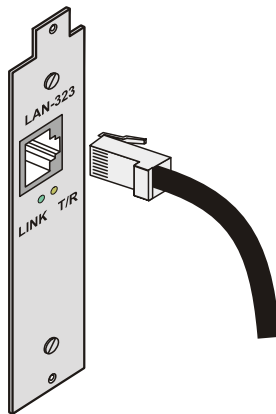


Figure 4-29: One H.323 Network connection

### Audio+ Music I/O Card

A special daughter card, which is attached to one of the Audio+ Functional Module can be attached to the rear of the Audio+ module, on the MCU's rear panel. It is used to playback music or recorded messages from an external device such as a tape recorder or CD player. Only one music card per MCU may be installed.

### Attaching the Music I/O Card to the Audio+ Module

The Music I/O card is used to attach an external audio device such as a tape recorder or CD player to playback music or recorded messages to participants waiting in the Welcome Queue during Greet and Guide conferences.

The Music I/O card is inserted in the rear panel of the MGC+ unit, and it is attached to the Audio+ module.

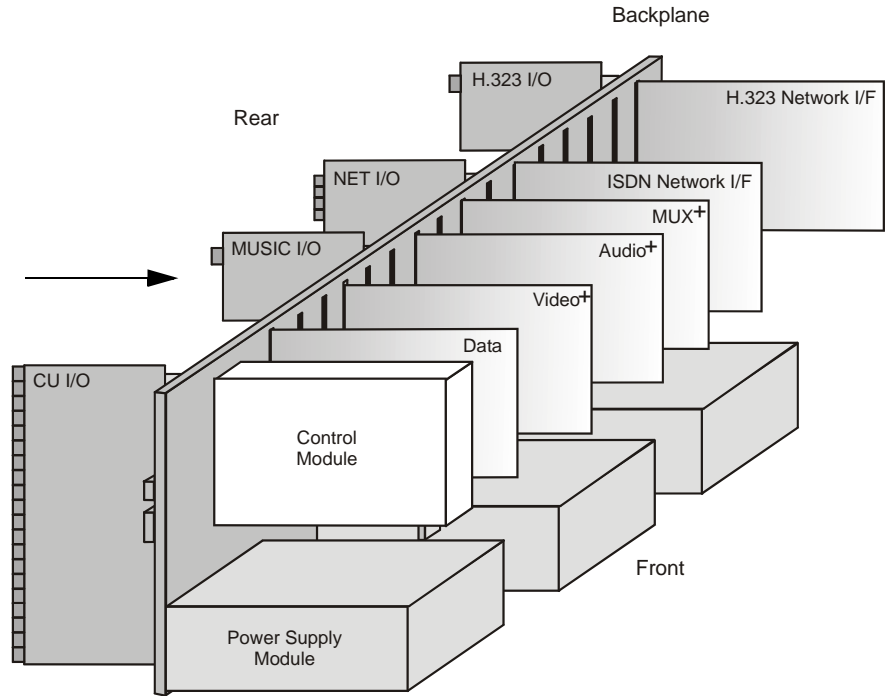
The Music-IO Card enables importing audio music from an external source such as a CD player, tape, radio, etc. It includes a Line-in jack and headphone output. The music is available to all endpoints.



Figure 4-30: Music-IO card

**To install the Music I/O card in the rear panel of the MGC+ unit:**

1. Carefully slide the Music I/O card into the slot in the backplane where the Audio+ module is inserted in the front.



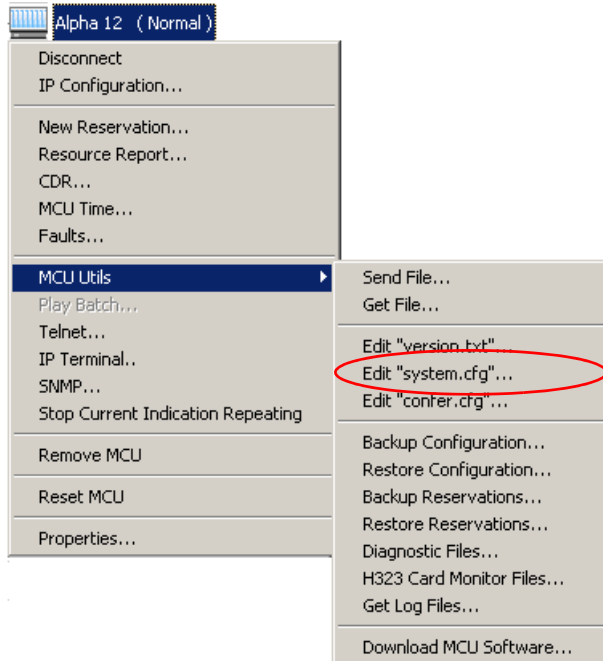
2. Tighten the screws on the rear panel of the MGC+ unit to secure the Music I/O card.



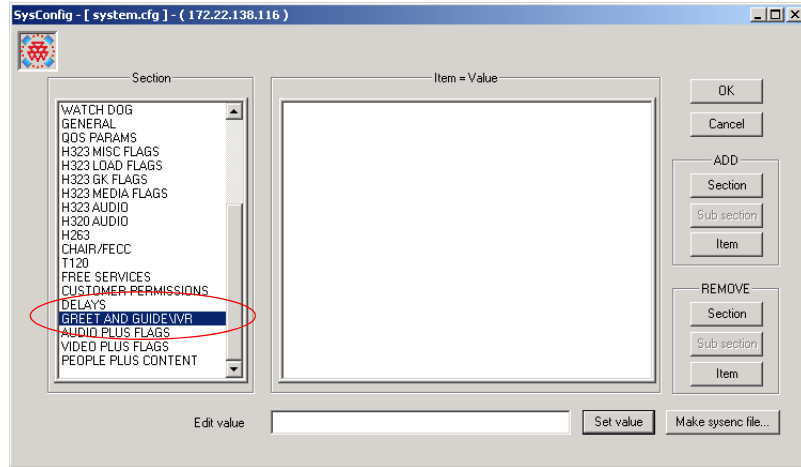
## Enabling the Audio+ Music I/O Card in the MCU Software

Once the Audio Message daughter card and the Music I/O card are installed, the system automatically identifies them. However, if you are upgrading the MCU by adding the Message daughter card and the Music I/O card, you may have to enable them in the MCU software.

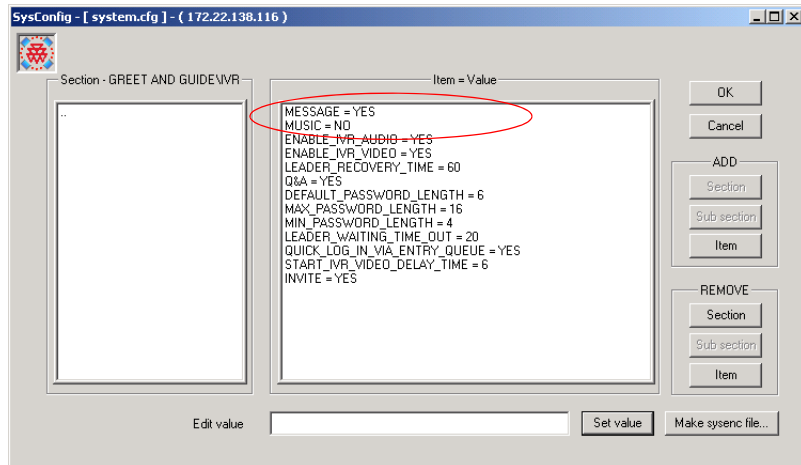
1. Select **Edit "system.cfg"** from the *MCU Utils* sub-menu.



The *SysConfig* dialog box opens.



2. Double-click on the **GREET\_AND\_GUIDE** line in the *Section* box. The Greet and Guide hardware items appear in the *Item = Value* box.



These values are set according to the Hardware installed in the system.

## **MUX+ Video Slides**

Video slides are downloaded and stored in the MUX+ memory. Up to four slides may be stored in the MUX+ memory – one per Message Service.



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# System Maintenance

The MGC+ is designed with ease of maintenance in mind. Most components are hot swappable and are accessible directly via the front panel or the rear panel.

Each module includes LED indicators, which reflect the state of the module. The LEDs are located on the front panel of the MGC+.

All external connectors are located on the rear panel. The main power switch is also located on the rear panel.

This chapter contains the following sections:

- A description of the controls and LED indicators
- Maintenance procedures
- Troubleshooting procedures

# Controls and Indicators

## MGC+ Unit Front Panel

The front panel of the MGC+ unit contains a number of controls, components, and indicators for using the MGC+ system. Figure 5-1 and Figure 5-2 show the front panel of the MGC+100 and MGC+50 and all their elements.

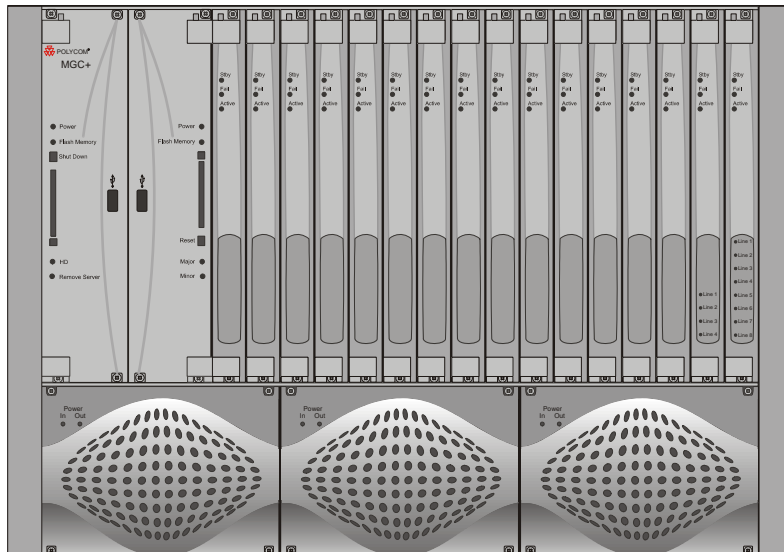


Figure 5-1: MGC+100 front panel

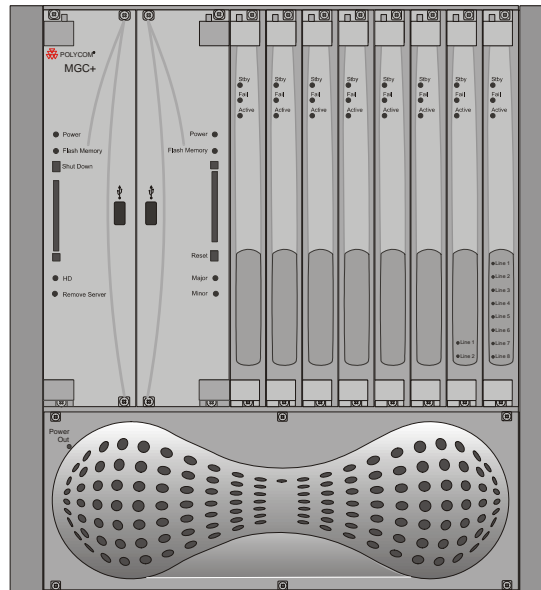


Figure 5-2: MGC+50 front panel

### LED Indicators

The following LEDs appear on the front panel:

- 4 LEDs on the ReadManager IAM
- 4 LEDs on the Control Unit (CU)
- 3 LEDs on each Functional Module except for the Network Interface Module which contains additional LED for each PRI span connected to the system
- 2 LEDs for each of the MGC+100 Power Supply modules
- 2 LEDs on the MGC+50 Power Supply
- 5 LEDs on NET-2 ISDN Network Interface Module
- 7 LEDs on NET-4 ISDN Network Interface Module
- 11 LEDs on NET-8 ISDN Network Interface Module

The system uses these LEDs to indicate operating states. The LEDs on the Net-2/Net-4/Net-8 are tri-color. Depending on the states of the LEDs inputs, the LED can be off, green, red or yellow. The LEDs on the front panel are described in Table 5-1.

Table 5-1: Front Panel LEDs

Module	Name	Color	Description
ReadiManager IAM (left group)	Power LED	Yellow	On. Not lit when OFF.
	Flash Memory LED	Red	Read or write enable. Lit when active.
	Shut Down button	NA	Turn the ReadiManager ON or OFF. OFF - Closes all ReadiManager processes and applications. ON - Starts all ReadiManager processes and applications.
	Compact Flash slot	NA	Future use.
	USB port	NA	Future use.
	HD LED	Red	Flashes when the Hardisk is active.
	Remove Server LED	Green	When lit, you can remove the ReadiManager server. This button is lit when you press the <i>Shut Down</i> button on the ReadiManager.
	Power LED	Yellow	On. Not lit when OFF.
Control Unit (right group)	Power	Green	Power supply normal.
	Flash Memory	Red	Read or write enabled, is lit when active
	Major	Red	A major fault exists on the MGC+ unit
	Minor	Yellow	A minor fault exists on the MGC+ unit



Table 5-1: Front Panel LEDs

Module	Name	Color	Description
Functional Modules (Audio+, Video+, IP+, MUX+, MPI and T-120)	Stby	Green	On during normal operation (refer to Table 5-2)
	Fail	Red	On when a failure has occurred (refer to Table 5-2)
	Active	Yellow	On when the module is handling a conference (refer to Table 5-2)
Net-2 (ISDN and T1-CAS) Network Interface Module (additional LEDs)	Line 1	Off	Span x is not in use
	Line 2	Green	Span x is OK
		Yellow	Span x yellow alarm (RAI)
		Red	Span x red alarm (LOS)
Net-4 (ISDN and T1-CAS) Network Interface Module (additional LEDs)	Line 1	Off	Span x is not in use
	Line 2	Green	Span x is OK
	Line 3	Yellow	Span x yellow alarm (RAI)
	Line 4	Red	Span x red alarm (LOS)
Net-8 (ISDN and T1-CAS) Network Interface Module (additional LEDs)	Line 1	Off	Span x is not in use
	Line 2	Green	Span x is OK
	Line 3	Yellow	Span x yellow alarm (RAI)
	Line 4	Red	Span x red alarm (LOS)
	Line 5		
	Line 6		
	Line 7		
	Line 8		
Power Supply Module	In	Green	Power-in from the mains is OK.
	Out		

The three Functional Module LEDs function as a group. Each state of the Functional Module and its associated LED array is described in Table 5-2. The (IDLE, ACTIVE, FAILURE, and PARTIAL FAILURE) states are the operational modes of the Functional Module. The (RESET, WAITING FOR MCMS and LOADING SOFTWARE) indicates the stages during the startup procedure of the Functional Module.

Table 5-2: Function Module LEDs

Module State	STBY	FAIL	ACTIVE
IDLE—Ready, but not used in a conference	<b>ON</b>	OFF	OFF
ACTIVE—Used in one or more conferences	<b>ON</b>	OFF	<b>ON</b>
FAILURE—Error state; board is out of operation	OFF	ON	OFF
PARTIAL FAILURE—Error state; part of board is out of operation	<b>ON</b>	<b>Flashing</b>	<b>ON/OFF</b>
RESET—Board is in Reset state	ON	ON	ON
TEST—Power-on self test	OFF	OFF	<b>Flashing</b>
WAITING FOR MCMS—Waiting for MCMS to start loading software	<b>Flashing</b>	<b>Flashing</b>	OFF
LOADING SOFTWARE	ON	<b>Flashing</b>	OFF

## MGC+ Unit Rear Panel

The rear panel of the MGC+100 and MGC+50 contains a number of controls for using the MGC+ unit. Figure 5-3 and Figure 5-4 show the back panel and labels all elements of the MGC+100/50.

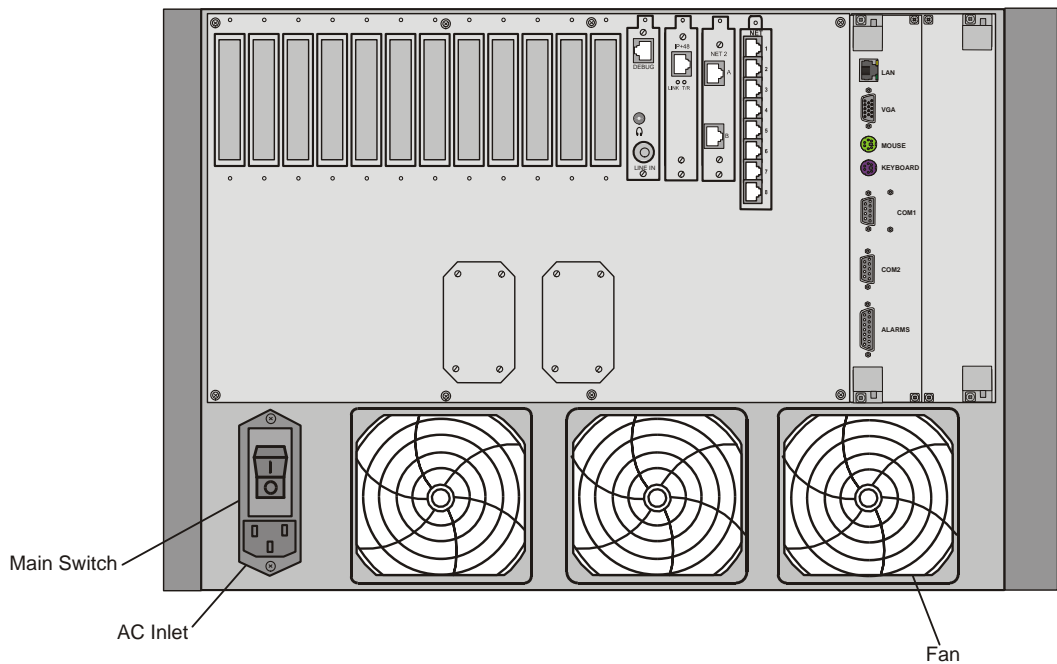
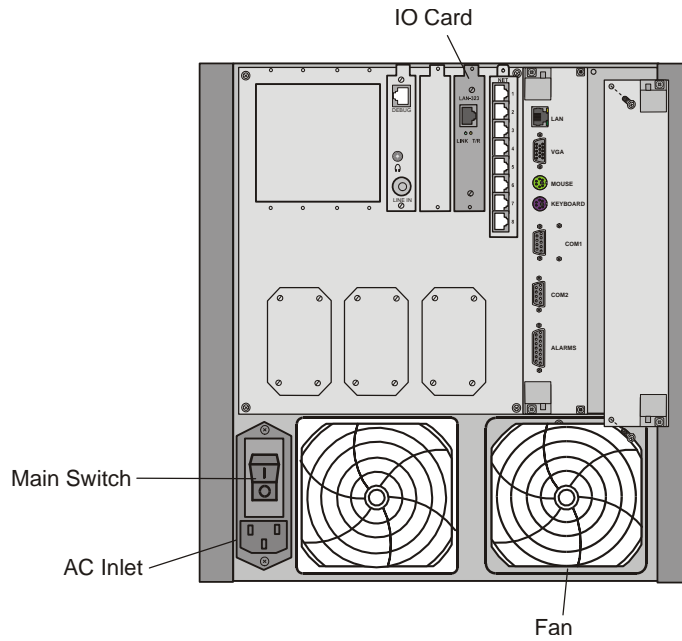


Figure 5-3: MGC+100 rear panel controls

The main power switch is used during installation and replacement of the main control unit only, since all other MGC+-100 components are hot swappable. The switch includes an AC circuit breaker.



*Figure 5-4: MGC+50 rear panel controls*

The main power switch is used during installation, and replacement of fans, main control module and power supply since the functional modules are hot swappable. The switch includes an AC circuit breaker.

## Corrective Maintenance

Corrective maintenance refers to changing or replacing an element of the system that is faulty. The MGC+ has several components in which problems may occur:

- ReadManager IAM
- Control Unit (CU)
- Function Modules:
  - Network Interface Modules (ISDN/T1-CAS, IP and MPI and/or Serial)
  - MUX+ Modules
  - Audio+ Modules
  - Video+ Modules
  - Data Modules
  - I/O Cards
  - Power Supply Module
- Fans



### Warning!

- All maintenance tasks are to be performed by qualified, authorized personnel.
- Use only replacement parts supplied by your dealer.
- Follow all procedures. Do not skip any steps.



Unless specified differently, the procedures described here are the same for both the MGC+100 and the MGC+50.

Before replacing parts:

- To ensure a part needs replacing, complete the troubleshooting procedures.
- Identify exactly which part needs replacing.
- Make sure you have the correct replacement part on hand.
- Make sure you are using proper ESD equipment, to prevent damage to the system.

## Replacing a Functional Module

The following procedure is applicable for both the MGC+100 and the MGC+50. All Functional Modules are hot-swappable and can be replaced with the system running. Use the following procedure to replace a faulty Functional Module:

1. Unscrew the screws on the front panel of the MGC+ that secure the Functional Module.
2. Use the plastic ejectors to pull the Functional Module out of its slot in the Backplane.
3. Carefully slide the Functional Module out through the front panel.
4. Slide in the replacement Functional Module.
5. Push the Functional Module firmly into the Backplane; making sure it is properly seated in its slot.
6. Tighten the screws on the front panel of the MGC+ that secure the Functional Module.

## Replacing the I/O Cards of Functional Modules

The following procedure is applicable for both the MGC+100 and the MGC+50. The I/O Cards (such as the NET I/O card) are hot-swappable and can be replaced with the system running. Use the following procedure to replace a faulty I/O Card:

1. Label then disconnect the external connections from the I/O card.
2. Unscrew the screws on the rear panel of the MGC+ that secure the I/O Card.
3. Pull the I/O Card out of its slot in the Backplane.
4. Carefully slide the I/O Card out through the rear panel.
5. Slide in the replacement I/O Card.
6. Push the I/O Card firmly into the Backplane; making sure it is properly seated in its slot.
7. Tighten the screws on the rear panel of the MGC+ that secure the I/O Card.

8. Referring to the labels, reconnect the external connections to the I/O card.

## Replacing the Power Supply Modules on the MGC+100

The Power Supply Modules are hot swappable and can be replaced with the system running. Use the following procedure to replace a faulty Power Supply Module:

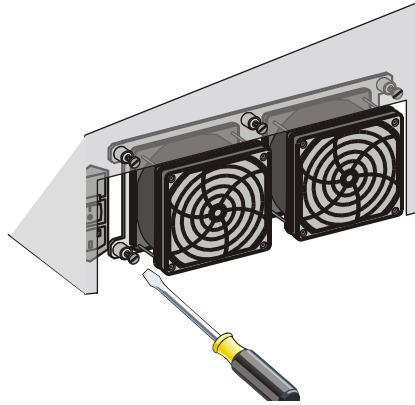
1. Unscrew the 4 screws on the front panel of the MGC+100 that secure the Power Supply Module.
2. Pull on the handle on the plastic panel of the Power Supply Module to pull the module out of its slot in the Powerplane.
3. Carefully slide the Power Supply Module out through the front panel.
4. Slide in the replacement Power Supply Module.
5. Push the Power Supply Module firmly into the Powerplane making sure it is properly seated in its slot.
6. Tighten the 4 screws on the front panel of the MGC+100 that secure the Power Supply Module.

## Replacing the Power Supply Module on the MGC+50

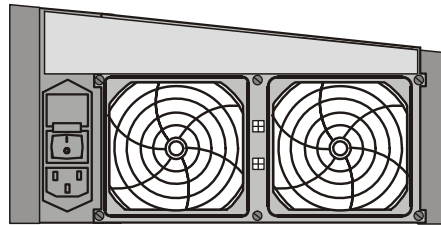
The Power Supply Module is not hot swappable and cannot be replaced with the system running. Use the following procedure to replace a faulty Power Supply Module:

1. If the MCU is working, exit the MGC+ Manager application and turn off the MCU. Otherwise, skip this step.
2. Unplug the MCU from the AC outlet.

3. Using a standard Phillips screwdriver, remove six spring-loaded screws from the fans cover on the MCU's rear panel.



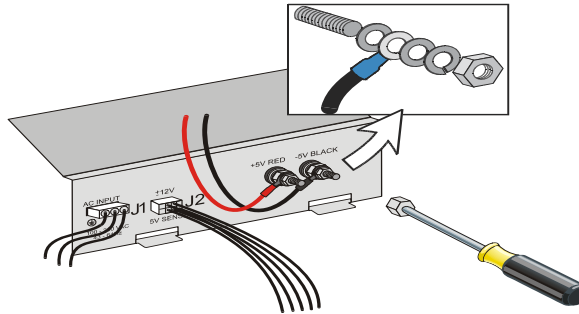
4. Optional. Remove the two jack connectors from the fan panel to completely remove the fans from the MCU.



5. Disconnect the AC input (J1) and the 12V/5V Sense connectors (J2).

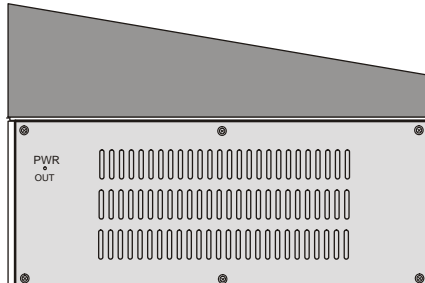


- Disconnect the +5V and -5V power cables using a 9/16" (13 mm) M8 nut driver.

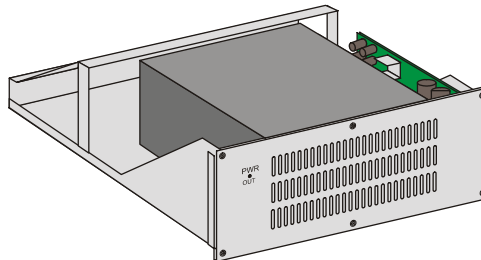


Tighten the two flat washers, the spring washer and the nut back to their +5V and -5V screws on the faulty unit to be shipped to the manufacturer. These items are delivered with the new power supply module.

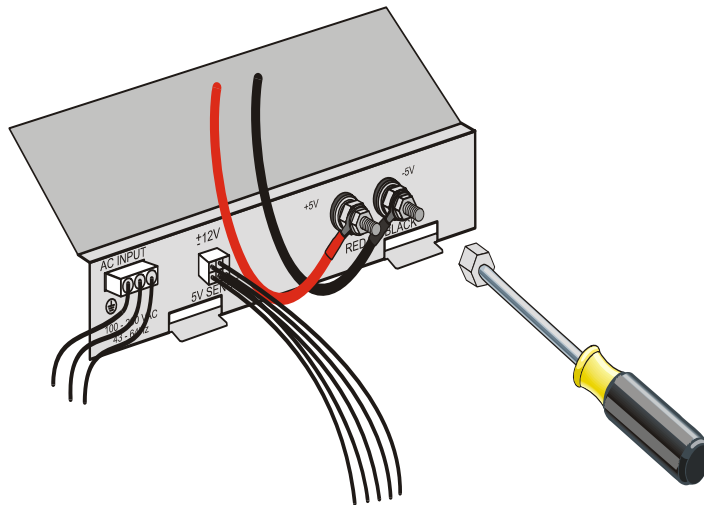
- Using a Phillips screwdriver, loosen the six spring-loaded screws on the front panel of the MGC+50 that secure the Power Supply Module.



- From the rear, carefully slide the Power Supply Module out through the front panel and remove.



9. Slide in the replacement Power Supply Module from the front panel and push it firmly into its place.
10. Tighten the six screws on the front panel of the MGC+50 that secure the Power Supply Module.
11. Connect the **red** power cable to the +5V screw and ensure that the nut is well fastened and secured:



- First install the flat washer.
  - Next, install the terminal ring of the power cable.
  - Next, install the second flat washer.
  - Then, install the spring washer.
  - Last, screw the nut.
12. Connect the **black** power cable to the -5V screw in the order described in step 11 and ensure that the nut is well fastened and secured.
  13. Reconnect the AC input (J1) and the 12V/5V Sense connectors (J2).
  14. Reposition the fans cover panel on the rear panel. Ensure that the two fan connectors are in their place and tighten the six screws to secure the fan cover to its place.
  15. Connect the AC power cable to the MCU and turn on the MCU. The green Power Supply Module LED should be green to indicate that the MCU power is on.

## Fan Replacement for the MGC+100

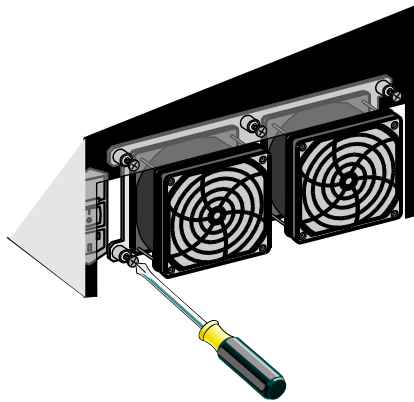
The fans are hot swappable and can be replaced with the system running. The fans are located on the rear panel of the MGC+100. Use the following procedure to replace a faulty fan:

1. Disconnect the cable to the fan.
2. Unscrew the four screws on the rear panel of the MGC+100 that secure the fan.
3. Remove the fan.
4. Position the replacement fan correctly on the rear panel.
5. Tighten the four screws on the rear panel of the MGC+100 that secure the fan.
6. Connect the cable to the fan.

## Fan Replacement for the MGC+50

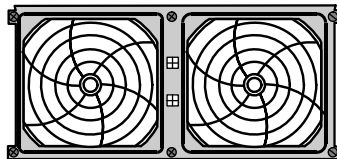
The fans are not hot swappable and cannot be replaced with the system running. Fans are located on the rear pane of the MGC+50. Use the following procedure to replace a faulty fan:

1. Exit the MGC+ Manager application, turn off the MCU and unplug it from the AC outlet.
2. Using a standard Phillips screwdriver, remove six spring-loaded screws from the fans cover on the MCU's rear panel.



Lower the fans cover carefully without tearing the cables to gain access to its inner side.

3. Disconnect the two connectors of the power supply cable from the inside of the fan panel. At this point, the fan panel is loose and it may be removed.
4. From the inside of the fan panel, push the connector panel mount locks of the faulty fan connector and push the connector to the front of the panel.



5. Unscrew the four screws on the Fans front panel that secure the faulty fan to the fan panel.

6. Remove the fan.
7. Position the replacement fan correctly on the rear panel.
8. Tighten the four screws on the Fans front panel that secure the fan.
9. Insert the connector to its place in the Fans panel and ensure that the panel mount locks are locked.
10. Connect the two connectors of the power supply cable.
11. Reposition the fans cover panel on the rear panel and tighten the six screws to secure the fan cover to its place.
12. Connect the AC power cable to the MCU and turn on the MCU. Check the fan is working correctly.

## Replacing the Main Control Module

The Main Control Module is not hot swappable. Use the following procedure for both the MGC+100 and the MGC+50 to replace the Main Control Module:

1. Exit the MGC Manager application, as described in the MGC Manager User's Guide.
2. Switch off the main power switch on the rear panel and disconnect the power cord from the power source.
3. Unscrew the four screws on the front panel of the MGC+ that secure the Main Control Module.
4. Use the silver plastic ejectors to pull the Main Control Module out of its slot in the Backplane.
5. Carefully slide the Main Control Module out through the front panel.
6. Slide in the replacement Main Control Module.
7. Push the Main Control Module firmly into the Backplane making sure it is properly seated in its slot.
8. Tighten the four screws on the front panel of the MGC+ that secure the Main Control Module.
9. Reconnect all internal cables to the Main Control Module.
10. Close the cover of the Main Control Module on the rear panel of the MGC+.

11. Connect the power cord to the power source and switch on the main power switch on the rear panel.
12. Turn on the MCU. Connect to the MCU via the MGC+ Manager, as described in the MGC+ User's Guide.

### **Replacing the Main Control Module rear I/O Panel**

Use the following procedure to replace a faulty I/O:

1. Exit the MGC Manager application, as described in the MGC Manager User's Guide.
2. Switch off the main power switch on the rear panel and disconnect the power cord from the power source.
3. Unscrew the 4 screws on the rear panel of the MGC+100/50 that secure the I/O panel.
4. Pull on the plastic handles on the rear panel of the I/O panel to pull the module out of its slot and Backplane.
5. Carefully remove the I/O panel.
6. Slide in the replacement I/O panel.
7. Push the I/O panel firmly into the Backplane and slot making sure it is inserted properly.
8. Tighten the 4 screws on the front panel of the MGC+100/50 that secure the I/O panel.
9. Connect the power cord to the power source and switch on the main power switch on the rear panel.
10. Turn on the MCU. Connect to the MCU via the MGC+ Manager, as described in the MGC+ User's Guide.

## **Replacing Compact Flash Accessories**

The MGC+ is supplied with two Compact Flash accessories:

- USB to Compact Flash adaptor
- Compact Flash 128MB Disk

When these parts require replacement, please contact Polycom Resource Center.



You are required to use only parts approved by Polycom, or supplied in the Polycom accessories kit.

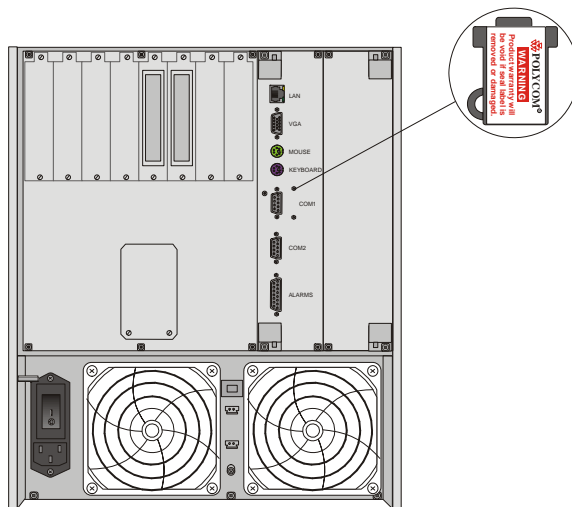
Table 5-1: Compact Flash Kit

Item #	Polycom P/N	Description
1	MSC2042A	Reader/Writer, Compact Flash Type I To USB 2.0
2	ICM2025A	IC Memory Compact Flash Card 128MB Type I

## Replacing the Dongle

The Dongle is installed on COM1 on the Control Unit (CU) rear panel I/O with a bracket. Prior to replacing a dongle, please contact Polycom Resource Center.

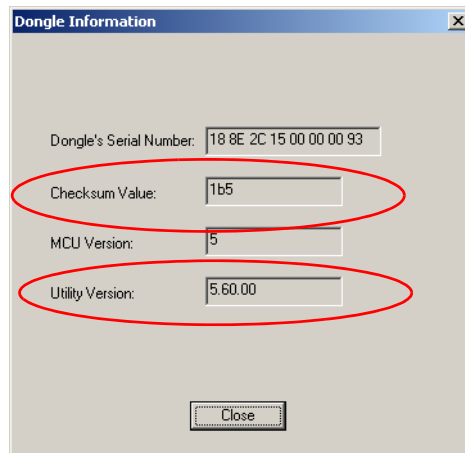
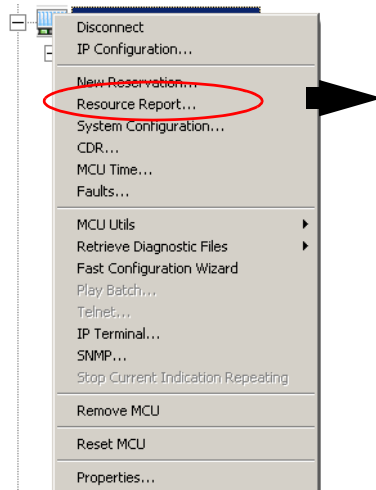
1. Remove the bracket by removing the screws and unplug the dongle.



2. Insert the new dongle in COM1 and re-attach the bracket by fixing the screws.

### Verifying the Dongle

- Check the serial number of the dongle currently installed on the MGC Manager; right-click the MCU icon, and then click **Dongle Information**. The *Dongle Information* dialog box opens, displaying the dongle's serial number and the current MCU Version.





The serial number displayed in the *Dongle Information* dialog box should match the serial number on the Dongle. If the numbers do not match, do not proceed and contact support.

## Shutting Down the MGC+ 50/100

Use the following procedure for both the MGC+100 and the MGC+50 to turn off the MGC+ 100/50:

1. Exit the MGC Manager application, as described in the MGC Manager User's Guide.
2. Switch off the main power switch on the rear panel and disconnect the power cord from the power source.

## Troubleshooting

The MGC+ unit provides on-line diagnostics for quick isolation and resolution of problems. The card status and the MCU's status can be viewed in the *Browser* and the *Status* areas of the MGC+ Manager main window. The full messages regarding the cards status can also be viewed in the *Status* box of the *Card Settings* dialog box. For more information, see the MGC+ Administrator's Guide, Chapter 4, "MCU Card Management".

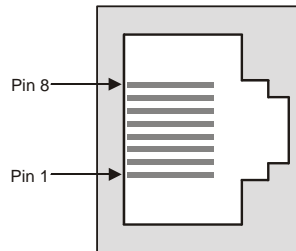
Faults and errors (usually software) are recorded in the Faults file and can be viewed in the faults dialog box (accessed from the MCU right-click pop-up menu). For more details, see the MGC+ Administrator's Guide, Chapter 5.

A list of system faults can be viewed via the Faults function. A detailed list of faults can be found in the MGC+ Administrator's Guide, Appendix B.

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# Appendix A: Interfaces Pin Assignment

## PRI Port Assignment



*Table A-1: PRI Port Assignment*

Pin	Signal Name
1	Receive Ring
2	Receive Tip
3	No connection
4	Transmit Ring
5	Transmit Tip
6	No connection
7	No connection
8	No connection

### LAN PIN Assignment

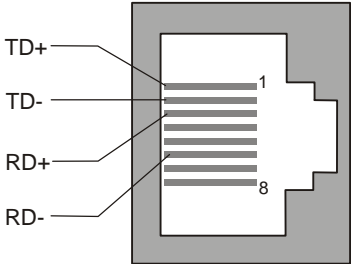


Figure A-1: LAN Pin Assignment

### Alarms Port Pin Assignment

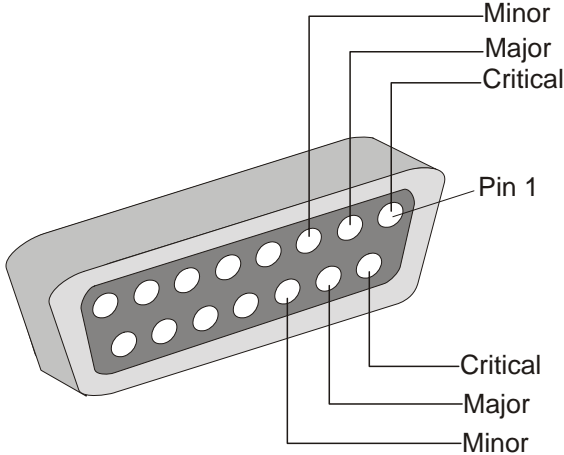


Figure A-2: Alarm Port Pin Assignment

## RS-232 Pin Assignment

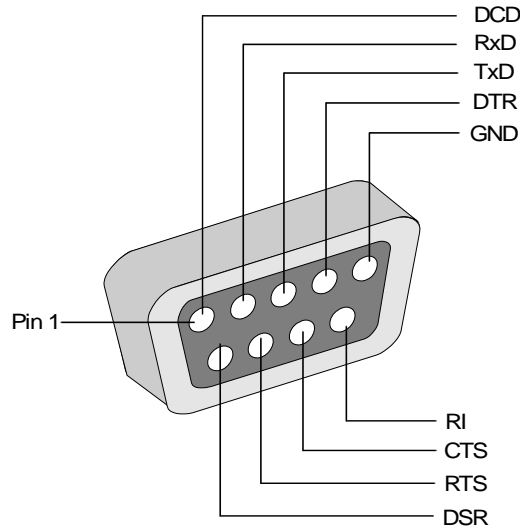


Figure A-3: RS-232 Pin Assignment

Table A-1: PRI Port Assignment

Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit DATA (TXD)
4	Data Terminal Ready (DTR)
5	GROUND (GND)
6	Data Set Ready (DSR)
7	Clear to Send (CTS)
8	Ring Indicator (RI)

### Serial Port Connectors Pin out Assignment

SOURCE	SIGNAL DESIGNATION	PIN NO.	PIN NO.	SIGNAL DESIGNATION	SOURCE
Return	Transmitted Data (B)	14	1	Shield	Common
DCE	Transmit Signal Element (A)	15	2	Transmitted Data (A)	DTE
Return	Received Data (B)	16	3	Received Data (A)	DCE
DCE	Receiver Signal Element Timing (A)	17	4	Request to Send (A)	DTE
DTE	Local Loopback	18	5	Clear to Send (A)	DCE
Return	Request to Send (B)	19	6	DCE Ready (A)	DCE
DTE	DTE Ready (A)	20	7	Signal Ground	Common
DTE	Remote Loopback	21	8	Received Line Signal Detector (A)	DCE
Return	DCE Ready (B)	22	9	Receiver Signal Element Timing (B)	Return
Return	DTE Ready (B)	23	10	Received Line Signal Detector (B)	Return
DTE	Ext. Transmit Element Timing (A)	24	11	Ext. Transmit Signal Element Timing (B)	Return
DCE	Test Mode	25	12	Transmit Signal Element Timing (B)	Return
			13	Clear to Send (B)	Return

Figure A-4: RS-530 Pin out (DB-25)

SOURCE	SIGNAL DESIGNATION	PIN NO.	PIN NO.	SIGNAL DESIGNATION	SOURCE
Common	Receive Common	20	1	Shield	Common
-	KG Resync (B)	21	2	Signal Rate Indicator	DCE
Return	Send Data (B)	22	3	KG Resync (A)	-
Return	Send Timing (B)	23	4	Send Data (A)	DTE
Return	Receive Data (B)	24	5	Send Timing (A)	DCE
Return	Request to Send (B)	25	6	Receive Data (A)	DCE
Return	Receive Timing (B)	26	7	Request to Send (A)	DTE
Return	Clear to Send (B)	27	8	Receive Timing (A)	DCE
DTE	Terminal in Service	28	9	Clear to Send (A)	DCE
Return	Data Mode (B)	29	10	Local Loopback	DTE
Return	Terminal Ready (B)	30	11	Data Mode (A)	DCE
Return	Receiver Ready (B)	31	12	Terminal Ready (A)	DTE
DTE	Select Standby	32	13	Receiver Ready (A)	DCE
DCE	Signal Quality	33	14	Remote Loopback	DTE
DTE	New Signal	34	15	Incoming Call	DCE
Return	Terminal Timing (B)	35	16	Select Frequency	DTE
DCE	Standby Indicator	36	17	Terminal Timing (A)	DTE
Common	Send Common	37	18	Test Mode	DCE
			19	Signal Ground	Common

Figure A-5: RS-449 Pin out (DB-37)

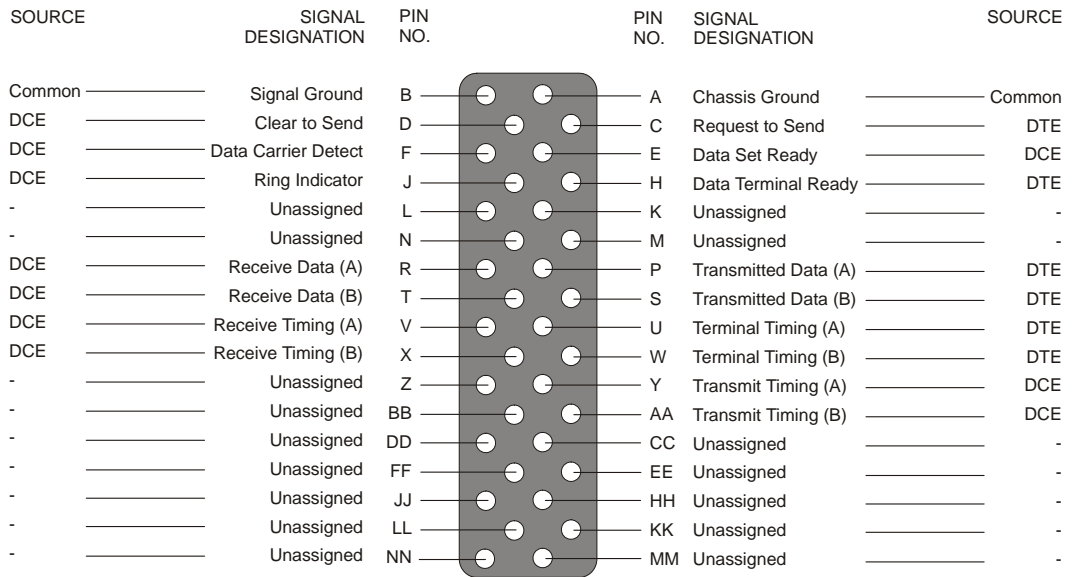


Figure A-6: V.35 Pin out (M-34 Connector)

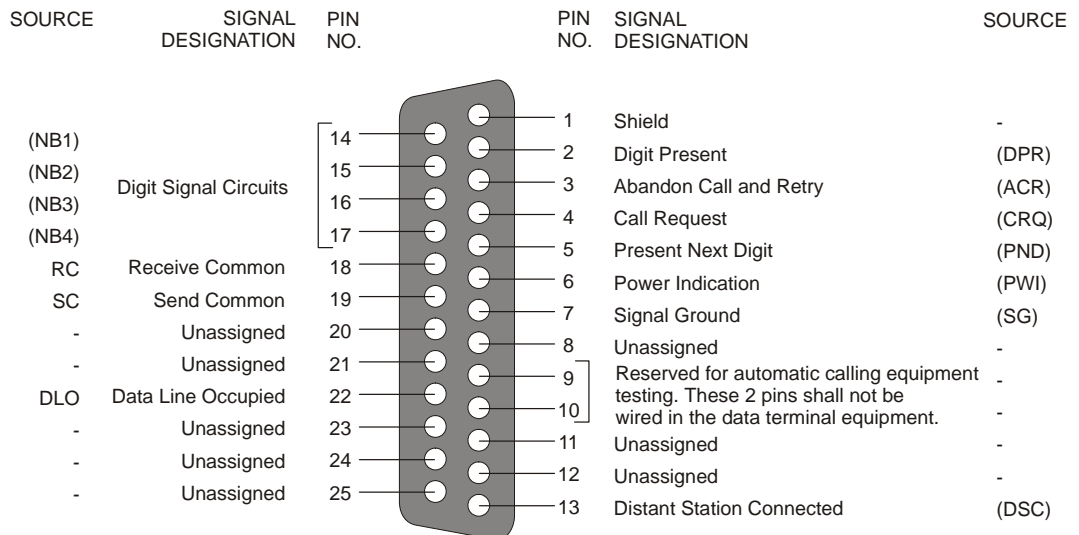


Figure A-7: RS-366 Pin out (DB-25)

### **Cables For the MPI-4/8 Network Interface Module**

There are three new cables for interfacing with the MPI-4/8 Network Interface Module in DCE. The difference in the cables is that they have certain pins that are crossed.

1. Part Number: CON2044A – Adapter RS-449 (BD37) to V.35 (female) crossed DCE.
2. Part Number: CON 2045A- Adapter RS-449/EIA530 Crossed DCE (DB37M/DB37F).
3. Part Number: CON2046A- Adapter RS-449/RS-449 Crossed DCE (DB37M/DB37F).